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ABSTRACT

The action research reports compiled in this revised Encyclopedia focus on distance education in South Dakota. Contents include: "Designing Instruction for Distance Education: Guide to Best Practice" (Michael Simonson); "Effectiveness of Strategies Used by South Dakota Distance Education Teachers" (Jan Brockel); "Consortium: Key To Successful Distance Learning in South Dakota" (Sally M. Crowser); "Distance Education and Special Needs Students" (Joseph R. Harrison); "Distance Education Needs, Interest and Opportunities" (Christi A. Harter); "If You Schedule It, They Will Come" (Mick Hoglund); "Elementary Students Responsiveness and Video Conferencing" (Penny Lensegrav and Kristi Pearce); "Student Achievement, Satisfaction and Instructional Delivery Modes" (Jon Lim and Johnathan Karol); "Creating a Collaborative-Based Classroom via ITV" (Summer Pankonen); and "Patterns of Communication in an Asynchronous Learning Environment" (Andrea Powers and Dorothy Fuller). (AEF)

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Encyclopedia of Research on Distance Education in South Dakota

Revised

South Dakota Department of Education and Cultural Affairs

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South Dakota Alliance for Distance Education:
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Preface

The South Dakota Department of Education and Cultural Affairs funded the research reported in this Encyclopedia through South Dakota's Star Schools project, the South Dakota Alliance for Distance Education (SDADE). In partnership with the South Dakota Department of Education and Cultural Affairs, the Instructional Technology and Distance Education program at Nova Southeastern University in North Miami Beach, Fl coordinated the action research component of the SDADE project.

A request for proposals was prepared by the ITDE program staff and distributed to teachers, administrators, professors and graduate students in South Dakota during the fall of 2001. This request was to identify researchers who were interested in investigating some aspect of distance education in South Dakota. There was a special emphasis placed on action research that dealt with local issues of interest to the teachers of South Dakota.

Proposals were reviewed and a number were selected for funding. During the spring and early summer of 2002, action research was conducted. Several meetings of the researchers were held and final reports were prepared. Finally, the research reports were edited and compiled into this revised Encyclopedia.

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Designing Instruction for Distance Education: Guide to Best Practice

Michael Simonson
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"Signal Fires?"

In one of the greatest Greek tragedies, Agamemnon, Aeschylus begins his drama with word of beacon fires carrying news of the fall of Troy and the return of the king -- news that set in motion Clytemnestra's plan to kill her husband in long delayed revenge for is slaying of their daughter. These signal fires would have required a series of line-of-site beacons stretching 500 miles around the Aegean Sea. Line of sight communication, as signal fires would require, has a long history. Most broadcast television applications require line of sight, even communications satellites orbiting in the Clarke Belt thousands of miles above the equator are "in sight" of the uplinks and downlinks on earth.

There is something visceral about communication with someone you can see that is missing when that person or group of people is not "in sight." Certainly, considerable communication and distance education does not involve face-to-face instruction. The heart of distance education is the concept of separation of teacher and learner. And, there are many that say the meeting of students with teachers will soon be a relic of the past, like signal fires. This group touts the convenience of anytime anyplace learning, and the power of modern communications technologies to unite learners with instructional events no matter when they are needed and no matter where students may be located.

Others advocate the need for face-to-face instruction. This group stresses the importance of seeing and being seen, and the personal nature of the teaching learning environment. Some even say that you cannot really learn some topics without being in a specific place with a select group of collaborators.

A third position is advocated by others who say that education should occur using a combination of instructional strategies. Schlosser and Burmeister (1999) even wrote about the "best of both worlds" where courses and programs would have varying percentages of face to face and distance delivered learning experiences.

To date however, no clear and verified process for determining whether face to face instruction, distance instruction, or combination of the two is best. Most instructional designers and instructional technologists know that Richard Clark was correct when he said that media are "mere vehicles", but when courses are designed and instruction delivered what are the templates, the processes, the approaches to be used to determine whether a module, course, or program should be delivered face to face or online? Or, what percentage of each is "best"? Where is the research? Certainly, decisions about how a course is to be delivered should not be based solely on the "beliefs" of the instructor, or the mandates of administrators. Signal fires told of the fall of Troy probably because that was the most appropriate technology available. Today, many technologies are available for instruction of the distant learner. Instructional design processes help the instructor to make informed decisions about technology use.

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Why Plan for Teaching at a Distance

Just like other kinds of teaching, teaching at a distance requires planning and organizing. However, teaching at a distance, whether synchronous or asynchronous, requires that greater emphasis be placed on the initial planning phase.

Instructional design should consider all aspects of the instructional environment, following a well-organized procedure that provides guidance to even the novice distance instructor. (See, for example, Figure 6–1.) The instructional environment should be viewed as a system, a relationship among and between all the components of that system—the instructor, the learners, the material, and the technology. Especially when planning for distance education, the instructor must make decisions that will affect all aspects of the system (Moore & Kearsley, 1996).

This chapter presents an organized and systematic way to go about planning instruction. This design process allows the instructor to consider elements such as the content, the nature of the learner, the process by which the learning will take place (methodology), and the means for assessing the learning experience. By following through with this process, the instructor will find that teaching at a distance is an exciting and dynamic experience, one that will be welcomed by both the instructor and the learners.

Principles of Instructional Design Systems

Systematic Process

The process of systematic planning for instruction is the outcome of many years of research (Dick & Carey, 1996). An analysis of the application of this process indicates that when instruction is designed within a system, learning occurs. The process of instructional design is a field of study. Instructional design is considered the intellectual technique of the professional who is responsible for appropriate application of technology to the teaching and learning process. In other words, instructional design is to the instructional technologist as the rule of law is to the lawyer, the prescription of medicine is to the medical doctor, and the scientific method is to the chemist – a way of thinking and solving problems (Thompson, Hargrave & Simonson).

A critical part of the process is to consider the components of a successful learning system (Dick & Carey, 1996). These components are the learners, the content, the method and materials, and the environment, including the technology. The interaction of these components creates the type of learning experience necessary for student learning.

The components must interact both efficiently and effectively to produce quality learning experiences. There should be a balance among the components—none can take on a higher position than the others. The attempt to keep the components equally balanced while maintaining their interaction effect is essential to planning quality instruction. Simply stated, a series of activities alone cannot lead to learning; it is only with the careful planning for their balance and interface that learning is the result.

Another critical part of the process is evaluation. For successful learning to take place it is vital to determine what works and what needs to be improved. Evaluation leads to revision of

instruction, and revision of instruction helps secure the final outcome of helping students learn (Heinich, Molenda, Russell, & Smaldino, 2002). Because of an emphasis on planning and revising, well-designed instruction is repeatable. This means that the instruction can be applied again in another class. For example, instruction designed for a televised, multisite class can be used again with a new group of students at different sites. Because it is "reusable," the considerable initial effort is well worth the time and energy.

Planning for Instruction at a Distance

The process of planning and organizing for a distance education course is multifaceted and must occur well in advance of the scheduled instruction. To eliminate trial-and-error preparation, distance-learning faculty should

- Keep in mind that courses previously taught in traditional classrooms may need to be retooled. The focus of the instruction shifts to visual presentations, engaged learners, and careful timing of presentations of information.
- In revising traditional classroom materials, consider ways to illustrate key concepts, or topics, using tables, figures, and other visual representations.
- Plan activities that encourage interactivity at all the sites. It is a common pitfall to focus on only one site during the process of managing the class and operating technology. Planning for interactivity reduces this problem and helps learners. Not only does the instructor have to plan for interaction, but also students may require training to participate actively in these types of activities.
- Plan activities that allow for student group work. This helps construct a supportive social environment. For example, the instructor could present case studies related to theories and concepts covered in the course, and then groups of students, perhaps in different sites, could discuss case study questions and reach consensus on a solution to the problem.
- Be prepared in the event that technical problems occur. If the equipment fails, it is important for students to have projects and assignments independent of the instructor and alternative means of communication (e.g., fax, phone, e-mail). Discussing with students ahead of time alternative plans in case there is a technological problem will eliminate confusion and loss of productive class time when a problem occurs (Herring & Smaldino, 1997).

In addition to considerations related to planning for instruction, there is also a need to examine issues associated with the separation of instructor and some or all of the students. Time constraints for class delivery, lack of eye contact, visualization of the materials, and planning for interaction require a reconsideration of classroom dynamics. Often instructors use visual cues, such as student facial expressions, within the traditional classroom and conversations with students after class to decide quickly to adjust the instructional approach for a course. These cues give instructors insights that help them personalize the instruction for the students and ensure a quality learning experience for all.

In an online course, it is more difficult to acquire visual clues about students. Even when using desktop conferencing technologies, the visual component provides limited information to the instructor. Students who incorporate emotions into their writing do not

help the instructor get a better view of the student within the non-visual online environment.

Teaching at a distance eliminates many of these cues. Alternative approaches to ongoing evaluation of instruction must be incorporated. If instructors ignore this area of preparation, planning to teach as they always have, they will feel frustrated. Likewise, students may feel alienated and will begin to tune out the instructor. The instructional development process must be based on the unique characteristics and needs of students, meshed with the teaching style of the instructor and the course goals and content. Interaction must be maximized, the visual potential of the medium must be explored, and time constraints must be addressed.

Issues to Address in the Planning Process

Who Are the Learners?

There are several reasons for bringing students together in a distance learning setting. Students can be pooled into classes of sufficient size to create a critical mass (Dede, 1990). Students can aggregate for advanced courses in subjects that might not otherwise be available on-site. Distance education can be an important approach to responding to the growing pluralism of learners' backgrounds, characteristics, or unusual learning needs that may require or benefit from specialized instruction.

Taking the time to learn about the learners in the class yields a more productive learning environment. Knowledge of general learner characteristics can inform the instructor of the nature of the students at origination and distance sites. This knowledge can aid the distance education instructor in overcoming the separation of instructor and students.

Along with the general information about the learners, an instructor needs to know the number of students in the class. Knowing how many students there are at each site and the number of sites involved in a face-to-face class can influence the level of interactivity. For example, in an Internet-based class (e.g., on the Web) with a large number of participants, it is likely that some students will fail to interact in discussions. Thus, an instructor needs to know how many students are enrolled, how many sites there are, and what technologies are available to them to plan effectively for interactive learning.

Also, it is essential to know the nature of the audience. Are students from an urban area? A rural area? What is their age range, grade range, and educational background? All this can have a marked impact on the levels of interaction among students. The instructor may have to plan more carefully for the types and levels of interaction to ensure a quality learning experience for all members of the class.

The cultural, social, and economic backgrounds of the students also constitute important information for the instructor (Willis, 1994). In addition, educational expectations of learners can also influence the quality of the learning experience. The attitudes and interests students bring to the class will impact the learning environment. Thus, an instructor who wants to create a quality learning experience for all members of the class, with the ultimate goal of learning as the outcome, will be certain to account for these variables in planning.

Analyze the General Abilities of the Class. Analysis of the cognitive abilities of the class allows the instructor to observe how students relate to the content of the lesson.

Such issues as clearly defining the prerequisite knowledge or skills for the specific learning experience are important to ensure a successful learning experience. The students' prior experience with similar types of cognitive tasks is important.

Further, learning styles have once again become an important area of consideration. With the introduction of Gardner's multiple intelligences has come the resurgence of an examination of learning styles (Gardner, 1993). How students approach learning is as important as how well they can function in the classroom. So knowing more about how students interact with information is important in creating a valuable learning environment.

There are a number of ways in which an instructor can determine students' general knowledge and ability. Pretests and portfolio reviews can provide information about learners' abilities. Because students are coming to the class from a variety of backgrounds and learning experiences, they may be under prepared for the content intended for a particular course, and thus will be frustrated and even unsuccessful in the learning experience. Or, conversely, they may already be familiar with the content and will be bored and uninterested in participating in the class.

By knowing more about students the instructor can develop supporting materials to individualize instruction. Varying the presentation of materials to match different learning styles (e.g., animation, text, verbal descriptions, visual messages) can also ensure the greatest potential for reaching all learners.

The instructor can present complex cognitive content in ways that give learners various tags for understanding the fundamental concepts, and thereby reach a wider range of individuals. People can remember complex material better if chunks of information are grouped into spatially related locations. Placing similar ideas in a logical sequence can aid retrieval of information at a later date.

Analyze Potential for Learner Interactivity. Students who are less social may find the distance education environment more comfortable for them. Students may become more expressive because of the perception of privacy and the informative nature of mediated communication. They may perceive the increased and varied interactivity and immediate feedback as a positive input to their interface with the learning experience.

Additionally, students can benefit from a wider range of cognitive, linguistic, cultural, and affective styles they would not encounter in a self-contained classroom. The emphasis should not be on the inherent efficiency of the distance learning, but on the values and services offered to students through their exposure to others (Herring & Smaldino, 1997). Relationships can be fostered, values can be expanded, and shared purposes or goals can be developed. Distance learning experiences can serve as windows to the world by providing extended learning experiences.

When special efforts are made, distance education actually can enhance learning experiences, expand horizons, and facilitate group collaboration (Dede, 1990). Students can have more direct experiences with the information; e.g., close-up viewing of an experiment is possible. Time for reflection is possible before responding to the prompts presented. And the ability to work with peers or experts enhances the potential for learning.

Understand Learner Characteristics. To be effective, it is necessary to understand the learners in the target audience. Willis (1994) suggested the following questions be asked prior to development of distance learning environments:

- What are students' ages, cultural backgrounds, interests, and educational levels?
- What is the level of familiarity of the students with the instructional methods and technological delivery systems under consideration?
- How will the students apply the knowledge gained in the course, and how is this course sequenced with other courses?
- Can the class be categorized into several broad subgroups, each with different characteristics?

These questions are not easy ones to answer. An instructor should attempt to find the answers prior to the first class meeting. Asking a few well-chosen questions of individual students will help the instructor understand their needs, backgrounds, and expectations. Additionally, students will feel they are important to the instructor. It may also be beneficial to discuss the learners with the remote-site facilitator. That person may be a valuable resource to the instructor by providing information about students prior to the instruction or by observing students at work. In an online environment, it is often more difficult for the instructor to get information about students, thus it is essential that the instructor plan a way of inviting students to share information about themselves. Be certain to be careful to respect their right to privacy while trying to learn as much as you can about them.

Helping Learners Understand the Context of the Learning Experience. Morrison, Ross, and Kemp (2001) refer to three types of content: Orienting Context, Instructional Context, and Transfer Context. They suggest that the learners need to grasp the intent of the instructor when participating in various types of learning experiences. When the learners have an understanding of the reasons why they are participating in a particular type of instructional activity, they will be better able to use that experience to expedite their own learning.

Each of these contexts serves a particular purpose for the learner. The Orienting Context refers to the students' reasons for being in a course. These reasons vary among the students. For example, a student may be participating in a course for credits toward a pay raise. Or, a student may wish to change positions within a company that is dependent on completing the particular study area.

Instructional Context addresses the learning environment. Scheduling a course to meet on at a certain time and location or specifying specific dates for completion of assignments also impacts the manner in which the student interacts with the class. Knowing how convenient it is for students to access the resources or to rearrange their own personal and work schedules is important when planning instruction.

The third context, Transfer Context, refers to the way in which students will use the knowledge. It is critical when planning that the instructor consider what information is important so the students will apply it to work or school applications. Students will value that information they perceive as useful. Knowing the students and their interests or needs will help the instructor plan useful learning experiences to ensure transfer of learning

Course Content

The content of a course needs to reflect where this content relates to the rest of the curriculum. It is essential to examine the nature of the content, as well as the sequence of information. In any distance-learning environment, one particular issue, that of time

constraints, impacts other planning areas. Time constraints refer to the actual on-line time for delivery, which is often limited and inflexible. The issue of limited time makes it necessary to closely examine the essential elements of the course content. The instructor needs to balance content with the limited time for learning activities and possibly remove extraneous, nonessential information.

Generally speaking, the scope of the content for a course needs to be sufficient to ensure the entire learning experience will lead to the desired outcomes. Concepts, knowledge, and specific skills need to be identified (Dick & Carey, 1996). Supporting information or knowledge is important to the scope of content analysis. Follow-up and applications of the content should be considered.

The instructor's time is best spent on content analysis if the content is organized within a hierarchy. Starting with the general goals, followed by more specific goals and objectives, the nature of the structure of the content can be made to fall into place. The resulting framework of information about content helps the instructor decide the value and importance of specific information to the total instructional package. It is important to remember that no matter which technological formats are used in distance education, the trend is to reduce the "amount" of information delivered and to increase the "interactive value" of the learning experience (Herring & Smaldino, 1997). Thus, the instructor may need to throw out content that had been included in a traditional presentation of a course. Or the instructor may need to consider delivering information through alternative means, such as additional readings or booklets designed specifically for the tasks.

The instructor also needs to examine the sequencing of information. A number of variables, e.g., characteristics of the learners, their prior knowledge, content, time, and number of sites involved, are critical when deciding the order of presentation of information. Because the instructor and some or all of the members of the class are separated, the material must be sequenced in a logical fashion for the students.

Goals and Objectives for Instruction. The challenge of education is to match the content of the subject to the needs of the learners. Broadly stated goals are a helpful starting place for the instructor. The instructor must decide what is appropriate for a group of students and for the individuals within that group. Each instructor constantly must face the challenge of adapting instruction to the student who is expected to learn it. While content is important, instructors must remember their focus is on the students. This is critical when establishing goals for any course.

The traditional approach for writing objectives is also effective for distance education courses. Specifically, objectives should state the conditions under which learning should occur, the performance expected of the learner, and the standard to which the performance will be matched.

One way to write objectives is as follows:

Given:	*the conditions under which learning occurs*
the learner will:	*the performance*
according to:	*a minimum standard*

The objectives of a particular lesson may not necessarily change simply because one teaches at a distance. Good instructional goals should form the basis for instruction, regardless of the medium used. Instructional goals and objectives always should be shared with the students, helping both the origination and remote-site students to focus on

the parameters of the instruction. This information may be included in course outlines, presentation handouts, or materials presented at the beginning of the course.

Teaching Strategies and Media

Students can provide insight into the design of the learning experience. They can give feedback in lesson design and instruction delivery. Using a simple feedback form, students can describe or indicate in some other way their expectations and perceptions of the class structure and the delivery mode. The instructor can examine the information from both origination and remote-site students to determine if the mode of presentation was effective for both types of locations. Evaluating these responses, the instructor can gain an understanding of how the learners perceived the class experience.

An instructor's personal philosophy will influence the approach to teaching at a distance. An individual's philosophical belief will affect selection of goals and curricular emphases, and influence how one views oneself as a classroom instructor. The instructor who believes in the philosophical arena of realism, idealism, essentialism, or perennialism will see the instructor as the central figure in the classroom, delivering knowledge and modeling to the student, an instructor-centered approach. On the other hand, the instructor who believes in the philosophies of pragmatism, existentialism, progressivism, constructivism, or social reconstructionism believes that the student is the central figure in the classroom (Herring & Smaldino, 1997). The instructor is viewed as the facilitator of learning by guiding, rather than directing, the students, thus modeling a student-centered approach.

While the dynamics of a philosophy will not predict an instructor's success in the distance education classroom, successful teaching at a distance places the recipients' needs before organizational convenience and at the center of planning and decision-making. The individual needs of the learners are brought to the forefront in education that uses electronic technology, because separation of learners from the instructor requires students to take more responsibility for learning. Consequently, the learner's opinions and needs play a more important role in decision making than is usual in an instructor-centered environment (Macfarlane & Smaldino, 1997).

It is oversimplified to suggest that there is one best way to teach at a distance. In any given content area there are several potential ways of providing a quality learning experience for the students (Heinich et al., 2002). However, the one thing that has been repeatedly demonstrated through research is that lecture, or the "talking head" approach, is the least successful strategy to employ in distance education (Schlosser & Anderson, 1996). What is essential in deciding which strategy or strategies to employ is the issue of engaging the learner.

The instructor needs to focus on selecting instructional strategies that engage all the learners in active learning. To do this, the instructor may need to de-emphasize the "informative" part of the instruction for more "discovery" of information. The emphasis on keeping the learners engaged in learning ensures that students will be in tune with the class.

Media Selection. Several models are often used in selecting media (Dick & Carey, 1996). The common theme among these models is the learning context, which is the content, the intended outcome, and the nature of the students. Practical considerations such as available resources for creating media and the technologies for delivery of

instruction also play a hand in the selection process. Mainly, though, the goals and objectives will influence the selection of media.

McAlpine and Weston (1994) have come up with a set of criteria for selecting media, whether they are commercial media or media developed specifically for a particular course. The first criterion is to match the medium to the curriculum or content. Other criteria include the accuracy of information, motivational quality, engagement quality, technical quality, and unbiased nature of material. These should be considered in selecting media in order to match student needs to the strategies employed.

Media that are "off the shelf" are often considered sufficient for a quality learning experience in the traditional classroom (Heinich et al., 2002). However, in a distance-learning environment, the "ready-made" materials may need to be adapted or modified to accommodate the technologies involved. Some materials may need to be enlarged or enhanced to be seen by students at a distance. With others the format may need to be changed to allow access.

Because of the nature of distance learning and the separation of the instructor from the students, it is essential that the instructor begin to think visually. Too often, instructors do not place enough emphasis on designing and using quality visual materials. Taking the time to develop good visual media will enhance the quality of the learning experience (Heinich et al., 2002).

Visualizing Information. Visuals provide a concrete reference point for students, especially when they are engaged in a nontelevised learning experience. Even if the visuals are just lists of concepts and ideas, they can help students. Visuals also help learners by simplifying information. Diagrams and charts often can make it easier to understand complex ideas. A visual that breaks down a complex idea into its components can show relationships that might be otherwise confusing to students. Also, visuals that serve as mnemonics can assist student understanding. And visuals help students in their study. They can use the visuals to prepare for tests and other means of assessing their learning.

When creating visuals, the instructor needs to keep certain things in mind (Herring & Smaldino, 1997). First is legibility. In a televised distance-learning environment, even with the close-up capabilities of the cameras, the choice of font and size can influence how easily students can read the text. Several "rules of thumb" should be applied:

- Use a large font, e.g., 24 or 36 point.
- Use a sans serif font, e.g., Helvetica.
- Use just a few words per line of text, e.g., six words per line maximum.
- Use only a few lines of text per visual, e.g., six lines per visual.
- Use a combination of both uppercase and lowercase letters; all uppercase is difficult to read.
- Use plenty of "white space" to enhance the readability.

Color can also play an important role in designing visuals (Herring & Smaldino, 1997). Color can increase the readability of text or graphics. However, the key to good use of color is in the contrast. Use a dark background and light lettering, or vice versa. Make certain to select colors that will not be compromised by the technology used for transmission; e.g., red vibrates in a televised environment. Further, select colors that will not be a problem for students who might be color-blind. More will be discussed on the use of media in Chapter 8, "Teaching at a Distance."

There are two other very important issues to be raised. First is that of copyright. No matter what technologies are incorporated in the distance environment, the instructor needs to respect the copyright restrictions that might apply. For example, in a televised class, the instructor may not be able to use a video without first obtaining permission to display it to the class. In a Web-based class, the instructor may have to have permission to post a journal article. An instructor needs to be responsible in obtaining copyright permissions where appropriate.

The second issue is that of access. The instructor cannot assume that all students at a distance have equal access to resources. Students may not have the technologies available. Also, students may not have the facilities at hand. The instructor needs to be certain that all students have similar learning experiences, including access to the materials. For example, if the instructor wishes students to use certain books or journals for outside reading, it is important to check with local libraries to be sure these materials are available.

Learning Environment

Educators are familiar with classroom settings. They are comfortable with using the space available to enable learning to take place. It is when the classroom shifts into a distance learning setting that the environment often becomes a challenge to the instructor. There are several important elements to address within the distance-learning environment.

Technology. The type of setting, be it place- or time-shifted, will influence planning decisions. Environments that are place-shifted are those that are synchronous but are not in the same location (e.g., a live video-based distance class). Those that are time-shifted are asynchronous, where students access the class at different times. Assessing the use of technology in a distant setting is essential. In any distance learning environment the technology becomes the element of most concern for the instructor. The instructor must become familiar with the hardware and the nuances of the technology to use them effectively. The instructor needs to balance concern for the operation of the equipment with effective teaching. Once the technology becomes transparent in the educational setting, the instructor can reflect on the lesson quality, the outcomes, and the plans for subsequent lessons.

Several issues are associated with technology when teaching in a distance-learning mode. First is the basic operation of the equipment. In a televised distance learning setting, switching between sites is usually a simple procedure, but it does require time to acquire the finesse to operate the switching buttons smoothly. Second, using additional cameras in the classroom can create some concern for the instructor. The overhead camera needs to be focused and materials lined up to ensure that learners in all sites can see the material. Third, the instructor should always consider what the student should be viewing during the lesson. Is it better to see the instructor, the visuals, or other students? When an instructor has had experience teaching with the equipment, these decisions become automatic, making learning the foundation for the decisions made (Herring & Smaldino, 1997).

In an Internet-based learning environment, the instructor needs to be concerned with the layout of the courseware and the types of resources available to the students at the distant sites. The instructor needs to be certain the material is designed in a way that is intuitive for the various types of learners who may be interacting with it. Further, the

instructor needs to be concerned about student access to the appropriate hardware and software to be successful in connecting to the courseware. And the instructor needs to be concerned that the students can complete the tasks expected of them. Finally, the instructor needs to be certain that the students understand the terminology being used.

It is essential the instructor be prepared with alternatives for each lesson in case of system problems. What will the students do during the lesson time if the technology is not operating properly—or at all? Preplanned contingencies should continue the learning process even though the technology is malfunctioning. Alternative lessons must always be ready, but it is hoped, never needed. And students need to be prepared to know what to do with those materials. The materials must be designed to be used without instructor intervention.

Resources. The second element to consider in the instructional environment is the resources available to students. What materials will they have at hand? What materials will be available in libraries and laboratories? Will students have access to resources for easy communication with the instructor?

Another consideration is the quality of the instructional setting. Is the room comfortable? Can students get to the room easily? Will the room accommodate the nature and type of learning activities planned? Can students move the tables and chairs about in ways to make learning easy?

These are the types of concerns that an instructor needs to address when thinking about the learning environment. It is difficult to plan for a particular type of learning activity if the room cannot be adapted or changed in any way. For example, if the instructor plans a group activity in which students will need to move chairs and tables, can they do it without causing technical problems?

Planning to Teach on the World Wide Web

Much of what has been suggested in the planning process is not specific to a particular type of distance technology or delivery mode. Rather the instructional design process is relatively open to any instructional setting. But, when planning to teach on the web, there are some essential considerations that an instructor needs to address.

One very important issue that the instructor is "ready" for the course to begin. It is very frustrating for students who begin an online course only to find that all the materials are not prepared or not accessible at the time they need them. It would be an advantage for the instructor planning an online course the first time to consider working 3-5 months in advance of the beginning date. This will ensure that the materials will be planned and prepared in a timely fashion.

Another important issue when teaching online is that of establishing the communications framework. All too often instructors of online courses "complain" that students expect them to be available all the time. If you do not intend to check your course materials daily, indicate that with the initial materials that are distributed. Tell students they can expect a response within a day or that you intend to be online checking the course specific days of the week. That way the interrupted communications process will not frustrate both students and faculty.

Instructors have found that to ensure quality and promptness with online coursework, it is important for the students to know exactly when assignments are due. A calendar or timeline is very important. Also, providing students with rubrics or guides for how to

complete assignments well is also very important. The more information students have about completing assignments, the fewer problems the students and instructor will experience during the course.

And, finally, when planning to teach online, advise students (and this is a good piece of advice for the instructor as well) to set aside specific periods of time during the week to work on the course. It is so easy to "let it slide" that often the complaint is there is never enough time to get all the work done. This is usually the result of someone letting the work pile up before getting to it. With an online course, it is best to plan two shorter periods per week, rather than one longer one. This helps to check things out, do work offline for a period of time, and then to finish up before the time period is up.

Part of the initial materials presented to the students should provide guidelines for students to ensure a successful learning experience. When it is noted that a student is falling behind in the work or is not participating at an acceptable level, the instructor should contact that student privately, either by electronic mail or by phone, to check to see if there is a reason for non-participation. This takes time, but the instructor will find it beneficial for a successful distance learning experience.

Evaluating Instruction

Assessment will be discussed in Chapter 11, and evaluation will be discussed at greater length in Chapter 12. However, there is a need to look at questions an instructor might consider as part of the planning process. These questions revolve around considerations related to the strategies selected, the learners' interaction with the learning experience, and the learning environment.

In the instructional design process, formative evaluation becomes an important aspect. Two questions need to be considered. The first relates to reflection on the action or activity: "Is this approach going to work?" (Schon, 1987). To be an effective educator, it is important to consider what can happen within an instructional event. All experiences, both positive and negative, have some element of surprise. Perhaps expectations were not achieved; perhaps a serendipitous event led to an altogether different, but pleasant, outcome. Whatever the nature of the event, it is essential to reflect upon what has happened.

Reflection may take the form of critical assessment of the events, satisfying curiosity about the nature of those events (Macfarlane & Smaldino, 1997). Reflection may focus on the success of the learning situation. It helps the instructor understand the learning event. Once the instructor has reflected upon what took place, it is time to move on to the second question of the formative evaluation process.

The second question is, "How can I make this better?" The instructor needs to examine the instructional event in terms of what worked and what appears to have been a problem. The second phase of the formative evaluation is concerned with helping the instructor ensure a more successful educational experience for students. The instructor needs to consider the learning task, the instructional materials, and the teaching strategies, and also the role that the technology may have played in the instruction.

The instructor needs to consider the elements of technologies and their effect on the students. Did the hardware components of the system cause the problem? If so, what was the nature of the problem? Was there a temporary interference with the transmission? Was weather or some other noncontrollable phenomenon causing problems with the

transmission? Can the hardware be improved? Can changes be made in the interactive instructional classroom to aid instruction in the future?

If the problem did not relate to the hardware, then what was the problem? Perhaps students needed to be better informed about how to use the equipment. It may be that students needed preparation for the lesson. Perhaps the instructor needed to prepare other types of handouts or manipulatives to ensure that the students could accomplish the tasks. Maybe the instructor needed to select an alternative teaching strategy to improve interactivity and student outcomes.

Because so many different factors affect the interactive learning environment, reflective teaching practices play a vital role in developing effective teaching practices. The process of determining what has transpired and how to change it creates a dynamic educational experience for both the instructor and the learners. Formative evaluation is essential for successful interactive distance learning experiences.

Other Issues

As with any planning, some of the aspects of the system that need to be considered are outside of the content, learners, and instructional setting. Three of these issues relate to student handouts, materials distribution, and the site facilitator.

Student Handouts

Even though the topic of student handouts is discussed at greater length in Chapter 8, it is also mentioned here because it is important for the instructor to think about handouts within the context of the planning process. The types of handouts will vary according to the age of the students and the content of the course. But whatever the type, it is important that the instructor realize that in a distance course, handouts are an essential communication link with students. Therefore, during the planning process, the instructor needs to invest time and energy in creating quality handouts for students.

Distribution of Materials

Even within a traditional class, the instructor is concerned with getting materials to the students. Often papers and books are distributed at the beginning of the class period. But when teaching at a distance, this task is rarely an easy one. Often the majority of the class is at a distance, and distribution of materials becomes a logistical nightmare.

An instructor needs to consider

- Getting the materials to the distant sites on time. A distribution network must be established for getting tests and other materials to those remote sites. The technology can be useful in transferring materials.
- Communicating with the students. Geographic separation between instructor and students does affect this communication.
- Dealing with time delays in material transfer. Students may have to wait a longer time than normally expected to receive written feedback. Instructors may elect to use other forms of telecommunications to facilitate this feedback.

Site Coordinators and Facilitators

The presence of a coordinator or facilitator at the distant sites is often an option. For many instructors and students, the presence of such a facilitator is important. Other

instructors consider the extra person more work than necessary. The decision to have a coordinator or facilitator might be best made as it relates to the context of the course, the students, and the types of technology being used.

For example, if the students are on the young side or are unfamiliar with the distant learning environment, a facilitator might be valuable to get them started with the class. The facilitator can serve as an extension of the instructor. This person can help with distributing materials, with maintaining organization and keeping order, and with proctoring. This person can also help with the instruction.

Students need to understand the facilitator's role in the learning environment. They need to know what is expected of the facilitator. Further, the instructor needs to have input into the selection and evaluation of the on-site facilitator to ensure a quality experience for all.

Models for Designing WWW Courses

Generally, there are four approaches for the instructional design of courses that are to be delivered asynchronously using the World Wide Web. The four approaches are not entirely new. Two are based directly on the individualized instruction movement of the 1950s and 1960s. The four models are

- Linear Designed Instruction
- Branched Designed Instruction
- Hypercontent Design
- Learner Directed Design

These four designs are depicted graphically. While they are different in approach and use, they have several similarities. First, instruction is divided into modules. Different instructional designers use terms such as units or blocks instead of modules, but all refer to a subdivision of a course's content. Generally, a three-credit college course would have about 12 modules, each taking about a week to complete. Designers further divide modules into topics that directly relate to the module. Topics can be further divided into concepts. An example of a unit of instruction – a course – that is divided into modules, topics, and concepts would be this book. This book has 12 chapters that identify the major subheadings of content. Each chapter is divided into topics, and topics are supported by concepts.

Linear designed instruction is based on linear programmed instruction. First, a content area such as distance education foundations is divided into about twelve important ideas. These ideas are called modules. Modules of instruction are divided into topics. Each topic has an instructional event, or learning experience, followed by some kind of an assessment. Before students are permitted to continue to the next topic within a module they must successfully complete the assessment. If the assessment is an objective test, they must pass the text. The sequence of topic-related instructional events followed by assessments continues until all topics in a module have been studied. Often, a module-ending assessment must be completed before the student moves to the next module. Similarly, there are often mid-course assessments, and end of course assessments that require the student to synthesize learning related to many modules.

Linear designed instruction is sequential. Students move in the same path through the concepts, topics and modules, and complete the same assessments and tests.

Branched designed instruction is similar to linear with two major exceptions. First, assessments are more sophisticated in order to diagnose a student's progress and understanding of concepts and topics. If a student shows a propensity for topics in a module it is possible to skip ahead, or branch forward. Similarly, if a student is having difficulty the assessment process will require that the student branch backward, or to remedial instruction before moving forward in the lesson.

The second distinguishing characteristic of branched designed instruction is the use of alternative instructional events or learning experiences. In other words, students may interact with different instructional content depending on the results of assessments. Just as a human tutor might decide that an algebra student needs more practice with mathematics, a branched designed lesson might require a student to complete a drill and practice lesson on long division. Branched designed instruction is difficult and time consuming to effectively produce.

Hypercontent designed instruction also has modules, topics and concepts. First, modules are identified. Next, topics related to the module are identified and learning experiences are designed and produced. These topics are presented using text, audio, graphics, pictures, and video. Finally, a module assessment activity is developed. This assessment is designed to determine if a student has successfully completed and understands the module satisfactorily. If so, the student moves to the next module in the sequence of modules.

Within the module there is no instructor determined sequencing of topics. Rather, the topics and corresponding learning experiences are studied in an order determined by the learner. In other words, the student has control and topics can be studied in a random, non-sequential manner, or in a hypercontent order. Often a course-ending assessment, such as a major paper, presentation, or product is required.

The learner directed design is the final design module. For this approach, the instructional designer identifies modules and topics, including learning experiences, but places no sequence or order on the topics within modules, or among the modules themselves. Learners decide what order of topics are studied, and sometimes even the topics themselves. Learners construct their own instructional strategies and even their own instructional design. Students move through modules in any order they choose. The instructional designer places few if any requirements on the student.

This approach requires considerable talent and effort on the part of the learner to be successful. Direction is given to students by module goals, and by outcome assessment activities. Some constructivists who advocate learner directed design procedures ask students to construct their own outcome assessments.

Instructional design models for online instruction are evolving. These four approaches draw on the experience and research of the programmed instruction efforts of the past. Some teachers mix and match the four approaches into amalgams of design procedures.

Summary

It is essential that the instructor take the time to plan and organize the learning experience when engaged in teaching at a distance. The instructional design process

provides the framework for planning. Instruction must be at a standard that is acceptable in all venues. The students should be engaged, and the instructor should be satisfied. Planning makes the difference in a successful learning environment.

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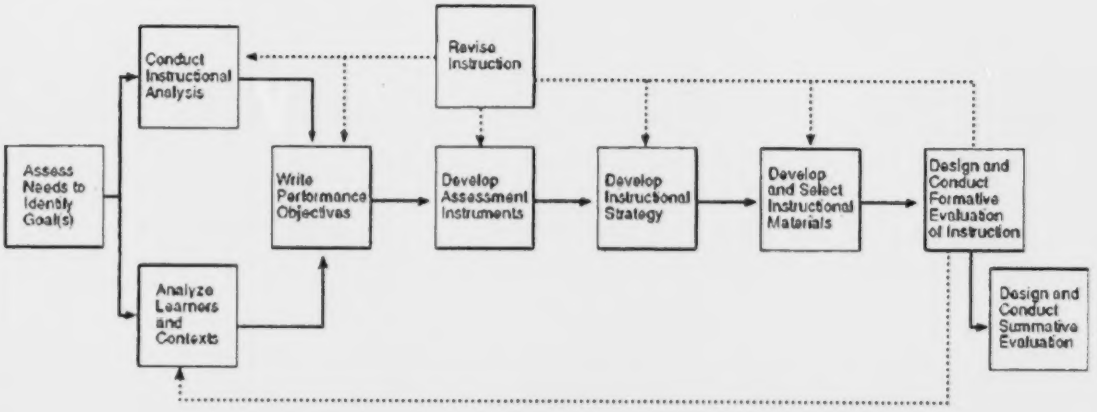
Revise Instruction
Conduct Instructional Analysis
Assess Needs to Identify Goal(s)
Write Performance Objectives
Develop Assessment Instruments
Develop Instructional Strategy
Develop and Select Instructional Materials
Design and Conduct Formative Evaluation of Instruction
Design and Conduct Summative Evaluation
Analyze Learners and Contexts

The Dick and Carey Systems Approach Model for Designing Instruction

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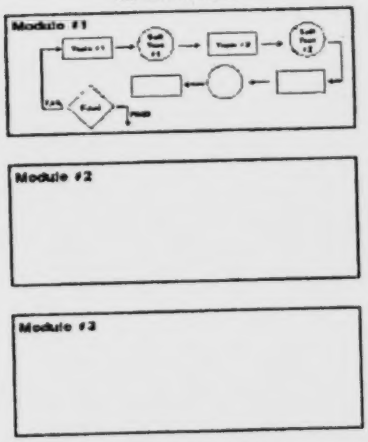
LINEAR DESIGN



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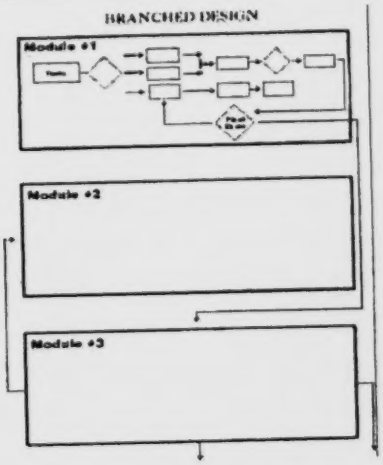

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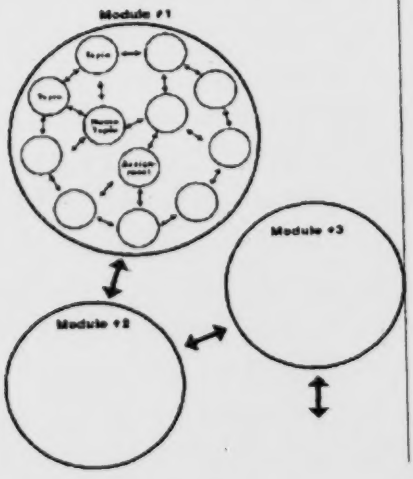
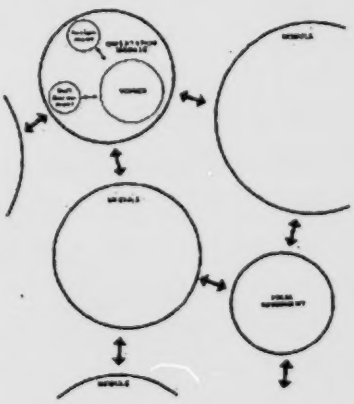


LEARNER DIRECTED DESIGN



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Effectiveness of Strategies Used by South Dakota Distance Education Teachers

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Introduction

"The key to success in distance learning is the teacher. If the teacher on the system is good, the technology can become almost transparent. No technology can overcome poor teaching which is almost exacerbated in distance learning application."

--Congress of the United States
Office of Technology Assessment

Educational institutions are embracing distance education as a means of overcoming the barriers of isolation in rural areas, cutbacks in educational funding, and the lack of available, qualified teachers. South Dakota is working hard to train its teachers to become successful in an interactive television classroom. The Dakota Digital Network (DDN) in South Dakota is a model of the systematic design and delivery of distance education using two-way video-conferencing equipment.

When educators are developing distance instruction or adapting traditional classroom instruction to interactive television, the content basically remains the same but its presentation requires new strategies. Interaction rises to the top in importance for the teacher who wants to most effectively promote learning in the distance-learning classroom. There are a variety of ways a teacher can be successful in this new arena, but one thing is certain: The newest technology cannot make up for poor instruction.

South Dakota has been striving to train its teachers to provide quality instruction at a distance using the DDN by offering a teacher institute called DTL (Distance Teaching and Learning) Academy. The main goals of this academy are to build an understanding of instructional strategies that effectively utilize the DDN, establish learning communities, and provide training for the operation of the videoconferencing equipment.

Purpose of the Study

The purpose of this study was to identify the techniques that teachers in South Dakota have found effective for distance education. Recognizing that there is a need in South Dakota for the availability of effective classroom instruction on the DDN and that techniques that work in the traditional classroom don't necessarily work in the distance

education classroom, it seemed important to draw on the expertise of those in the field to identify the instructional strategies they find most effective and use most often.

Literature Review

In teaching over interactive television, the traditional notion of the teacher as the expert and dispenser of great knowledge whose job it is to fill the minds of the students in the classroom through the use of lecture will be driven out and replaced by a more active and student-centered learning environment. This is the most important message in the research on interactive television instruction: delivery and content need to be modified for the distant classroom.

Effectiveness of Interactive Television Education

According to Cyrs and Conway (1997) in their textbook *Teaching at a Distance with the Merging Technologies*, research findings are consistent over the years: "There is no significant difference in learning outcomes between traditional and televised instruction, live or videotaped." They go on to emphasize that television does not affect the quality of instruction. Cyrs and Conway (1997) report that more than 600 studies over the past thirty years indicate that students learn as well, as much, and as quickly over instructional television as they do in traditional classrooms.

Distance learning students not only acquire knowledge about the content of a course, they also develop critical thinking skills (Thielke Huff, 2000). A study by Marie Thielke Huff, compared changes in the critical thinking skills of distance education students receiving instruction through interactive television to students enrolled in the same course but receiving face-to-face instruction. Thielke Huff found that both distant and on-site students increased their critical thinking skills with no statistically significant difference between the two groups with regard to their acquisition of critical thinking skills. This study points out that interaction among students and between students and instructors enhances the students' opportunity for learning to think critically (Thielke Huff, 2000).

Cyrs and Conway (1997) report that studies indicate that students can and will learn through interactive television courses. It is the quality of instruction that impacts learning. Teachers who will teach via interactive television need to learn further skills and will allow them to take advantage of this medium.

Effective Teaching Practices in Distance Education

Research shows that teaching by television requires unique skills that go beyond traditional classroom teaching methods and styles. Thomas E. Wolfe states in his article "Putting Interaction into Interactive Television," that "research strongly supports the effectiveness of interactive television as a medium for distance learning, It also indicates that the role and skills of the instructor are critical to that effectiveness" (Wolfe, 1998).

Cyrs and Conway (1997) conclude that when instructors make modifications, and the interactive television classroom includes the principles of visual thinking, student involvement, use of study guides, and appropriate presentation skills, students taking

these courses perform as well or even better than students taught in a traditional classroom setting.

Distance educators and researchers agree that more interaction is better (Mottet, 1998). Cyrs and Conway define interaction on interactive television as "more than instructors asking questions. It means students interacting with other students in exercises and activities designed to promote critical thinking. It also means students interacting with media such as study guides with fill-ins, programmed learning modules, computer-based instruction, etc."

Interactive teaching methods include communication between the teacher and students and also communication among students. The type of method chosen should depend on the desired outcome of the activity. Cyrs and Conway (1997) believe that interaction promotes cooperation rather than competition among students. It is important for students to understand what type of work they will be doing and why it is important.

Wolfe (1998) found that some successful methods of interaction include teaching interview, case study, and group discussion. He suggests teachers ask frequent, in-depth questions and foster interactive discussions within the distance classroom. King and Witney (1998) report that student-teacher interaction plays a major role in any learning environment and then when learners are active participants in the learning process, they perform better. In their evaluation of engaged learning activities, they found that students liked interactions with students at a remote site, role playing, good feedback and examples. Some students did report, however, that they wished the instructor would just lecture.

Teachers in South Dakota have been receiving formal training in successful methods of teaching over interactive television through the Distance Teaching and Learning (DTL) Academies that were implemented in the summer of 2000. During this three-week academy, participants learn the basics of operating the video conferencing equipment and adapting curriculum for distance delivery (Bauck, 2001). In their evaluation of this process in South Dakota, Simonson and Sparks (2001) report that "the lengthy training provided in the DTL Academies is an excellent technique that alleviates apprehension."

In summary, this brief literature review reveals several concepts: (1) Distance education can be as effective as traditional classroom instruction, (2) teachers need to learn the skills and modifications necessary to make distance education effective, and (3) interaction is vital to the effectiveness of a distance education experience.

Methodology

This study involved the use of an emailed questionnaire. The questionnaire was developed by the researcher after a review of distance education literature. This questionnaire was reviewed by experts in the field and pilot-tested by teachers.

The instrument listed techniques that educators might use when teaching over interactive television. These techniques were categorized as follows: study guides, presentation, small groups, reinforcement – verbal, reinforcement – nonverbal, and assessment. The respondents were asked to indicate how frequently they use each technique for distance classes. On the frequency dimension, a 5 on the scale indicated

the technique was used "very often," 4 = "often," 3 = "sometimes," 2 = "seldom", 1 = "never," and DK was used for "don't know."

The respondents were also asked to rate the effectiveness of these techniques. On the effectiveness dimension, 5 on the scale indicated "very effective," 4 = "somewhat effective," 3 = "rather effective," 2 = "ineffective."

The survey was distributed to teachers in South Dakota who have used the Dakota Digital Network (DDN), South Dakota's two-way video-conferencing network.

Findings

Findings are listed according to each category of the study.

Study Guides

Most of the teachers who responded use some type of study guide, and they find study guides to be very effective for the distance education classroom. The most common types of study guides used are an outline of notes and a checklist of items to be covered. The least common type of study guide used is a word picture. However, several teachers indicated uncertainty about the meaning of the term.

Presentation

Lecture is the most common means of presenting information used by this group of teachers, with a five to ten minute lecture being slightly more common than a short three to five minute lecture. Lectures longer than ten minutes are seldom used. These teachers rated lecture as a very effective means of presenting information and indicated that the longer the lecture, the less effective it became. These teachers seldom use a guest speaker, although most indicated they thought it was an effective technique.

Video clips followed by discussion are seldom used by the respondents, but they indicated it would be a very effective presentation technique. Longer videos are very seldom used.

Having student groups present information from parts of a chapter was not often chosen as a means of presenting information, but it was seen as a very effective technique. On the other hand, students reading a selection out loud and discussing it with the group was seldom used, although it was perceived as an effective technique.

One of the most common techniques used by these teachers is demonstration and demonstration followed by practice, and they find them to be very effective. Storytelling by the teacher is seldom used but seen as effective. Field trips followed by discussion are almost never part of the distance education classroom for this group of teachers, although they find it to be effective. The use of PowerPoint to present information varied greatly among the respondents. In general, they indicated using it either often or never. PowerPoint was seen as a very effective means of presenting information.

Visual analogies are seldom used by these respondents, but they find visual analogies to be very effective.

Small Groups

In general, this group of responding teachers did not use many group activities. The exception to this is discussion in pairs then with the whole group. These teachers

indicated they occasionally use that technique and found it be extremely effective. However, other small group activities such as case studies, role playing, skits, TV commercials, group exams, and webquests were seldom or never used, but most teachers indicated a favorable reaction to the effectiveness of such techniques.

Reinforcement

The survey included a list of verbal reinforcement techniques, many of which are not commonly used in the classroom such as writing rap-style lyrics of key content points, song lyrics used to illustrate a point, personal vignette, student or teacher pantomime, and poll. Most teachers indicated they almost never use these techniques, and few teachers even rated their effectiveness. As a whole, however, those that did rate the effectiveness of these techniques ranked them as very effective.

Teachers also responded to a list of non-verbal reinforcement techniques. Very few provided a rank for their perceived effectiveness of the techniques. Drills and games were the most common non-verbal reinforcement technique of those listed, but were used slightly more than "seldom." Used never or seldom by most respondents are crossword puzzles, flashcards, puzzles, mnemonics, and true/false statements. As a whole, these techniques were seen as being effective.

Assessment

Questioning is the assessment technique on the survey that all respondents use often or occasionally and rank as a very effective technique. All respondents use written tests often or occasionally and rank them as very effective. Another assessment technique used by these teachers occasionally and found to be very effective is a worksheet that is corrected in class. A progress quiz (short self-tests that are not graded) and a quizzical (students question each other following a presentation) were seldom used, and the few who provided an effectiveness rank listed them as effective. Some teachers found asking students to provide a one minute oral summary of a major point of the lesson to be effective. Techniques including journals, essays, and PowerPoint presentations were shown to be used either often or never by the responding teachers.

Discussion and Conclusion

The purpose of this study was to learn which techniques South Dakota distance educators are using and how effective they find these techniques. These teachers are providing study guides for student use, giving short lectures and demonstrations, discussing in small groups, and using a variety of traditional assessment tools including worksheets, tests, and questioning. They are using techniques they find effective, but they also ranked some techniques as very effective that they are not using.

Cyrs and Conway (1997) conclude that when instructors make modifications, and the interactive television classroom includes the principles of visual thinking, student involvement, use of study guides, and appropriate presentation skills, students taking these courses perform as well or even better than students taught in a traditional classroom setting. Are South Dakota instructors making modifications include the principles of visual thinking in the interactive television classroom? This study suggests these modifications are being made to a limited degree. Are teachers making

modifications for sufficient student involvement? This study suggests that students are involved through questioning and worksheet activities. Are teachers using study guides? The teachers who responded to this survey use study guides in some form and find them to be very effective. Are teachers using appropriate presentation skills? The teachers who responded to this study tend to use traditional presentation skills such as lecture.

One limitation of this research is the low number of respondents. If the survey had gone out in the middle of the school year rather than at the end, I believe the response would have been better. I sent the surveys out in May. After two weeks I sent them again to those who hadn't responded. Several weeks later I made phone calls to many of the teachers asking them to respond to the survey. Some indicated that they do not check their school email during the summer. I believe research is continuing on this topic at the Department of Education and Cultural Affairs in South Dakota through student evaluations taken at the end of each semester. It is important to routinely assess the effectiveness of methods of deliver and assessment in the interactive television classroom.

Table 1 – Survey results

Frequency Mean		Effectiveness Mean
	Study Guides	
2.5	Outline of notes	3.0
2.3	Interactive study guide	2.9
1.9	Fill-in-blank notes	3.0
2.5	Checklist of items to be covered	2.7
1.6	Word picture	2.3
2.0	Diagram to label	3.1
	Presentation	
2.8	3-5 min. lecture	2.8
3.3	5-10 min. lecture	2.7
2.3	Lecture longer than 10 minutes	2.2
1.7	Guest Speaker	2.4
2.1	Video clips followed by discussion (trigger video)	2.8
1.6	Longer video	2.6
2.5	Student groups present information from parts of the chapter	3.0
2.6	Demonstration	3.2
2.9	Demonstration followed by practice	3.2
1.5	Field trip – discuss in class	2.5
2.3	Storytelling by teacher	2.6
2.2	Visual analogy	3.0
1.9	Students read selection out loud and discuss	2.6
2.4	PowerPoint to present information	2.8
	Small Groups	
2.8	Discussion in pairs then with the whole group	3.6
1.4	Case studies	
1.5	Role playing	
1.7	Skits	*2.8
1.4	Prepare TV commercials	
1.6	Group exam – small group decides on answers to exam	
1.7	Webquests	
1.3	Reinforcement - verbal	
1.3	Rap It Up – students write rap-style lyrics of key content points	
1.5	Song lyrics – students identify why certain lyrics reinforce points in a lesson	*2.6
1.3	Personal vignette – Students relate personal	

	experiences to a topic	
1.3	Student pantomime	
1.3	Teacher pantomime	
1.1	Poll	
	Reinforcement - nonverbal	
1.7	Crossword puzzle	
2.3	Drills	
1.5	Flashcards	
2.3	Games	*2.6
1.4	Puzzles	
1.3	Mnemonics	
1.8	True/False Statements	
	Assessment	
1.6	Journals	2.8
2.5	Worksheet and correct in class	3.3
2.4	Progress Quiz – short self-tests that are not graded	3.0
3.5	Questioning	3.3
2.1	Quizzical – students question each other following a presentation	3.7
2.1	One minute summary by students of a major point of the lesson	2.9
1.7	Reflections – respond to "I realized that…," "Today I learned…."	3.2
2.0	Students make PowerPoint presentations	3.1
3.1	Written Test	3.0
1.9	Essays	3.0

*The responses for this entire section were averaged due to a low number of responses.

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Consortium: Key to Successful Distance Learning In South Dakota

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Abstract

This study researches the use of consortia in South Dakota schools which utilize Digital Dakota Network (DDN) or a similar type of distance learning infrastructure. Several schools in South Dakota have recently created and joined consortia in order to teach and/or receive classes via distance learning. According to a survey completed by 113 South Dakota school districts, including private, Class "AA", "A", and "B", 63% of these schools use distance learning in their schools, and of this 63% utilizing distance learning,, 62% participate in a consortium of 8-30 schools.

Introduction

The *American Heritage Dictionary* (1993) states the definition of *consortium* as "an association or a combination, as of business, in order to engage in a joint venture. A cooperative arrangement among groups or institutions" (p. 297). Many schools, particularly small schools, have created consortia. The schools in a consortium share curriculum, teachers, professional development, administration, and many other aspects of education. Presently, the consortium has a major role in the utilization of distance learning in the schools. It seems that the schools teaching and/or receiving classes via distance learning in South Dakota are often a part of a consortium. What do these consortia consist of? Why have so many schools become members of a consortium recently since obtaining the distance learning opportunity? One must ponder if schools involved in consortia teach and/or receive more courses via distance learning than those schools which have no connection with consortia.

Purpose of Study

Very little research has been completed concerning consortia in distance learning, especially in South Dakota. Since South Dakota is in the forefront of distance learning in the nation because of the vast wiring and technological work of our Governor William Janklow, research is needed referring to the utilization of the distance learning technology. This research must include the topic of consortium since so many discussions include distance learning and consortium simultaneously. Also, the state of South Dakota needs research concerning the various ways schools organize curriculum and procedures while teaching over Digital Dakota Network, South Dakota's universal distance learning technology. Governor Janklow intends for all schools, big and small, East River and West River, in consortia, and non-consortia, to teach and receive classes throughout the state via distance learning. However, many schools have not utilized the

distance learning technology whereas other schools use it extensively. Perhaps, membership in a consortium exists as a key to successful distance learning in South Dakota. This study will investigate the issue of consortium and its effect in South Dakota's distance learning.

Literature Review

Very few research articles have been published about consortia utilized in distance learning in South Dakota. Many articles contain information on distance learning, including the benefits, disadvantages, and the procedures required to initiate distance learning, including virtual high schools. Much is also written about the connection among high schools and various universities. Many professional articles also include information concerning consortia among national universities and their on-line courses for students who cannot commute to work. Many states presently utilize distance learning, and each state learns from the others in order to improve their own distance learning programs.

According to Keith Krueger, executive director of the Washington, D.C. based consortium for school networking, "Data show that some of the rural states are leaders in connectivity while some of the bigger states are surprising in their absence" (Semas, 2001, p. 31). This may explain why South Dakota is a leader in the technological wiring among schools. Judith Harkham Semas (2001), contributing editor and writer for Curriculum Administrator, writes an extensive article on three pioneering states in the distance learning arena, one being South Dakota. South Dakota received its internet connections 1996-1998 after which the Governor placed T-1 connections to every public elementary school building and ATM T-1 connections to every middle and high school. This connection brought together the towns of South Dakota, many of which lie over 100 miles from the next. In 1999 Qwest donated $17.1 million in the form of 200 high end, two-way video systems (VTEL systems) to the state (Semas, 2001). Therefore, each high school and free-standing middle school received its own unit. In order to educate teachers to use the equipment, the state held Distance Technology and Learning academies (DTL) around the state. Teachers were paid room and board and a stipend to attend. Tammy Bauck, South Dakota's director of technology states, "South Dakota is the first to make a robust attempt at systematic design and delivery" (Semas, 2001, p. 33). Continuing these DTL academies around the state will enhance the systematic use of the distance learning equipment.

Because of this technology in place, students may participate in the state Intranet's distance education program. Advanced Placement courses are now offered on-line so that even the most rural schools with few teachers may have access to the classes. University and standard courses from various schools in South Dakota are also offered. South Dakota's focus has been on building a "sophisticated infrastructure and providing the training to effectively tap its capabilities" (Semas, 2001, p. 34). Bauck concluded her comments by stating that presently the state's distance learning program is in need of formal, publishable research (Semas, 2001).

On to a larger look at distance learning and consortium throughout the nation: several states have virtual high schools in place at which students may take classes any time, any place, better known as asynchronous learning. These virtual high schools bind students, teachers, and information from around the world. E.D. Hirsch, author of well-

known educational material states that these schools "put students on more equal footing and allows them to proceed at their own pace" (Chaney, 2001, p. 21). In addition to virtual asynchronous high schools, many states do as South Dakota does and offers synchronous classes to children in other schools or homes.

This distance education shows the benefits of decreasing chronic teacher shortages, decreasing demands from students and parents, decreasing dropout rates, disinterest in students and low achievement rates (Chaney, 2001). In addition, students in small, rural, or low socioeconomic status school districts may take specialized courses not normally available to them. Also, home schooled children may take these on-line courses to increase their instruction. Ideally, students who are chronically ill may still complete their education. (Chaney, 2001).

As well as benefits to any project come disadvantages or problematic areas of which many can be worked out. The scheduling of the classes can cause concern because schools work on so many various schedules. Quite near and similar to South Dakota in so many ways is North Dakota where Vicki Hobbs (1990) completed research on distance learning in North Dakota. In North Dakota, the state works with six consortia consisting of two to seven schools in each, teaching 334 students. These distance learning classes take place within a cluster of schools usually within a geographically proximate area. All of the distance learning educators believed that participating districts should adopt the same class schedules. Yet, three-fourths of them believed that non-synchronized school calendars would present a problem to schools participating together. Togetherness is important for students to get to know classmates and teachers, creating a more optimal learning environment (Hobbs, 1990). In addition to the calendar, problems existed because of the various schedule in bells. Seventy percent of the educators didn't appreciate the fact that the regular class schedules differed from the distance learning schedules, and therefore, students would have to leave class early or return late in order to participate in the distance learning classes. Usually students missed approximately ten minutes of class due to the overlap between distance learning classes and regular classroom classes. As a result of this research, 65% of the North Dakota schools involved in distance learning modified their school calendars to accommodate the classes, and 61% modified the bell schedule (Hobbs, 1990). In addition to scheduling, many teachers who have previously worked with groups find it difficult to do so in distance learning. Usually the group work needs to be completed outside of class. Group dynamics suffer at first because of the difficulty of getting to know each other with distance learning. Some schools also feel that they need more technical support while working with distance learning than they presently obtain.

Many schools throughout the nation which have distance learning equipment use it for many more uses than distance learning. For example, in North Dakota, Hobbs (1990) found that only 13% of schools do not use their equipment for additional purposes. Schools used their equipment for student enrichment (30%), community use (48%), business use (9%), school sports scheduling (13%), administrative discussions (43%), and teacher inservice (54%).

Creating a distance learning system takes a great deal of expertise. One must consider the expense involved. What about instructor costs, delivery costs, and learner-instructional costs? "It's less expensive to use technology to deliver instruction to learners than it is to deliver learners to instruction (Franklin, et al 1996, p. 5-10).

Franklin and fellow researchers from Indiana University also state that the costs of installing a distance learning system are "more than offset by increased revenues from new learner population" (p. 5:10). Franklin goes on to state that a wide-area network, which connects cities, states, and nations historically is regulated by the government, but may change soon. Schools and states must consider this fact when setting up a distance learning system. How and when materials are distributed must also be considered when initiating a new program. Also, an organization must decide who will distribute the materials. Material distribution is a major logistical issue for organizations beginning in distance learning. This issue depends on the cost, time, material format, and learners' locations, all aspects which an organization must deal with (Franklin et al, 1996). When setting up distance learning, one cannot forget about facilities and personnel needed for the teaching and facilitating. Sometimes a class may have to be taught before or after school in order to make the schedule feasible. Many workers, such as learners, instructors, registration staff, site facilitators, and program coordinators, are involved in the process. These support staff are the "silent heroes of successful distance programs..., the glue that keeps the distance education enterprise together" (Willis, 1993, p. 33). Students and faculty will find it invaluable to have a single organization coordinating the many support activities required for effective distance learning. As the number of programs increase in the distance learning, so does the managing (Franklin et al, 1996).

In addition to creating a strong management system, the instructor needs to create a strong communication between the learners. Barry Willis (1993) of University of Alaska states in his Distance Education Practical Guide that instructors must provide interaction and feedback through phone calls, conference calls, computer conferences, mail, and personal visits with learners. This personal contact may reduce student attrition. A recurring theme occurs in education that must continue through distance learning. Willis states that "student to student interaction and belief that communication among learners is critical to understanding and applying information" (p. 26). Students often begin class with little confidence and at unease with the instructor. This feedback should create a better rapport. Usually teachers and their students in distance learning have little in common when considering culture and day-to-day experiences because of the distance between them. As a result, teachers must learn as much as they can about their students (Willis, 1993). They must discuss how to enhance student motivation. In addition, teachers must demystify the distant teaching process by practicing. Also, they must set rules, guidelines, and standards for the course. Last, but definitely not least, teachers must uphold these standards.

According to those involved in distance learning, lives are changed because of it. Distance learning is becoming vital to the schools because it improves education. It has made lives easier and given people more time to pursue dreams and futures by attending post-secondary courses on- line. Also, high school age students are taking college courses on-line, saving money and time later. On-line learning is growing exponentially. In 1993, 93 "virtual universities" offered courses on line, and in 1997, 762 "cyber schools" included an alternative education (Draper, et al, 1999). In a 1998 survey produced by the Educational Commission of the States and given to the governors of the United States, 97% of responding governors felt they needed to encourage lifelong learning in post secondary education. Eighty-three percent believe that students need to receive education at any time, any place. As a result, 94% support investment in

technology (Thomson Learning, 1999). One of the more recent consortia, On-Line Universitie Anonymous, was coordinated by the University of Washington. This consortium has course listings from 14 various universities around the nation (Chaney, 2001). Likewise, Western Governors' University, an on-line consortium, delivers courses developed by accredited institutions in 16 states (Thomson Learning, 1999), and in the South, the Southern Regional "Electronic" Campus offers courses from 50 colleges and universities in 15 states.

Research Situation

Each public high school and free standing middle school in South Dakota has its own Dakota Digital Network (DDN) system. Some of these schools have an additional distance learning system unique to a consortium initiated with a grant previous to Governor Janklow's wiring project completed in 1999. Although many schools have scheduled their systems heavily, several of the schools in the state do not utilize their DDN system for teaching or receiving classes. Likewise, but not respectively, some of the schools in the state have formed consortia to deal with their distance learning usage, including management, instructors, and schedules while many have not.

Data Collection

The researcher observed two distance learning courses initiated from Artesian-Letcher High School. The researcher also discussed distance learning and consortia with expert distance learning instructors. Some of these instructors were in consortia and some were not. Then surveys were sent to each high school in the state, including the private schools. These surveys questioned the school's use of distance learning equipment (DDN) and the school's involvement in a consortium. (See Appendix A.) These surveys asked specific questions about the teaching of distance classes and receiving distance classes. Surveys were first sent to all principals via email, but because no response was received, the researcher sent surveys via snail mail. Out of 196 surveys sent, 113 schools responded equating to 58% of South Dakota schools. The 58% that responded included 14 private schools (12% of respondents), 8 Class "AA" (7% of respondents), 29 Class "A" (26% of respondents), and 62 Class "B" (55% of respondents) . In total, South Dakota has 19 private high schools (10%), 16 Class "AA" (8%), 58 Class "A" (30%), and 103 Class "B" (52%).

Results

Governor Janklow did not put any distance learning systems into the private schools so of course those schools do not teach or receive classes via DDN. However, the Catholic schools in the Sioux Falls area do have a consortium and their own distance learning system. The Catholic Diocese included the Catholic schools in the western part of the state in this consortium in order to exchange classes. Because this study consists of the use of consortia in schools, the results will include the private sector many of which do not have distance learning, so the percentages have been figured with the non-using private schools considered.

Out of the 113 respondents, 97 schools (86%) have a working DDN system or similar distance learning system in the high school. As of Spring 2002, 15% of the respondents also had an additional DDN system in the middle or elementary school. More schools are obtaining additional systems as the schools show extensive use of their original system. Some of the schools, such as those in the DIAL consortium program, have an SIVN system which they use in addition to the DDN system. Some of these schools include Artesian/Letcher, Ethan, Woonsocket, Mount Vernon, and Mitchell. Another system widely used is the Southeast Interactive Long Distance Learning (SILDL) system used by a consortium of Beresford, Alcester/Hudson, Gayville/Volin, Wakonda, Irene, Canton, Avon, Bon Homme, Centerville, Hurley, Viborg, and Parker. Some schools, such as Estelline, Willow Lake, Deubrook, Rutland, Brookings, Clear Lake, Grant-Deuel, and Elkton, use a PictureTel system. Another consortium of schools using PictureTel in addition to DDN consist of Baltic, Garretson, Tri-Valley, West Central, Montrose, Canistota, Emery, Hanson, Bridgewater, and McCook Central. A smaller school New Underwood stated that the State took its DDN system away due to lack of use and gave the system to a school that uses its system extensively.

Very few schools teach courses via distance learning. Twenty-six schools (23%) teach classes via DDN or similar distance learning. Of these 26 schools, 2 Class "AA" schools (8%), 7 Class "A" (27%), and 17 Class "B"(65%) schools taught the courses over DDN. Some of the schools responded with comments such as they couldn't make the schedule work out, and one school didn't want to share their "good teachers" with other schools. In one school, the administration would like to teach classes, but no teachers want to teach over distance. Those 26 schools taught 45 courses to 456 students in 64 schools via distance learning. These classes taught included subjects such as TI-83 Math, Spanish, cisco networking, advanced biology, senior math, Accounting I, visual basic programming, calculus, college algebra, anatomy, drama, agricultural management, driver's education, health, business communication, natural resources, German, and personal finance.

Results show that many more students at several more schools receive classes via distance learning than teach classes. Of the 66 respondents (58%) who receive classes via DDN, only one Class "AA" (1%), 15 Class "A" (23%), and 50 Class "B" (76%) schools receive classes. These 66 schools receive 128 classes from 35 schools. These classes were taught to 766 students. Many of these courses are received from universities such as Northern State University which offers free high schools courses to South Dakota schools via distance learning, University of South Dakota, South Dakota State University, and Mitchell Technical Institute. Many of these courses received consist of college level courses that high school students take for dual credit: high school and college, saving the students time and money once they attend college. The courses received consist of the following and do overlap with those taught discussed in the previous paragraph: Biology II, psychology, Spanish, calculus, French, TI-83 Math, visual basics, space and astrology, English 101 and 210, driver's education, health, parenting/relationship, German, cisco programming, graphic arts, art history, anatomy, business communication, college algebra, physics, pre-calculus, chemistry, British literature, child development, space/astronomy, agriculture, financial management, theater, and EROS. Some schools don't see a need to receive classes via distance when the classes are taught at their own school while in some schools students are reluctant to take distance classes.

Results show that 20 of the respondents (18%) both teach and receive classes. Of the 113 respondents, 71 (63%) schools use the DDN or similar distance learning system to either teach or receive classes. Of the 63% of all the schools in South Dakota (represented in this study), including the private sectors, that incorporate distance learning, 44 (62%) schools are involved in one of the eight consortia represented in the response to the survey. The eight consortia include 96 schools in total. However, 28 (39%) of the schools that teach and/or receive via distance are not a part of a consortium. On the other hand, of the 42 schools (31%) that do not participate in distance learning, 34 (81%), do not belong to a consortium, whereas the other 8 (19%) schools that do not participate in distance learning do belong to a consortium. Several of these schools mentioned that they do plan to teach and/or receive classes next year via DDN.

Conclusion

This study represented South Dakota schools quite accurately. Although only 113 of 196 schools responded to the survey, one can observe from the data collection that the percentage of a specific class of respondents equated with the actual percentages in the state. This study clearly indicates that those schools in South Dakota that are involved with a smaller consortium of schools do use their Digital Dakota Network distance learning equipment or a similar system much more extensively than those schools who are not in a consortium. However, one cannot regulate that a school must join a consortium in order to use distance learning in South Dakota because this study clearly demonstrates schools that are not involved in consortia are readily using the system. The fact is the percentage of those involved in distance learning without a consortium is much lower than the schools involved in a consortium. The study reveals that larger schools do not use their distance learning equipment most likely because they have so many elective courses offered at their schools whereas the smaller more rural schools such as in northwest and northeast South Dakota use distance learning to enrich their small schools where they would never be able to obtain high level electives. As one distance learning instructor from northwest South Dakota stated, it is cheaper for the little schools to pay money to their consortium to offer a beneficial course to their students than to hire another fulltime teacher. Governor William Janklow intends for all schools in South Dakota to act as a consortium and all obtain classes from each other. From this survey, which truly represents the schools in South Dakota, many obstacles lie in the way of 196 schools working simultaneously together to make distance learning work effectively. This study indicates that in order to extensively use the distance learning equipment to its fullest extent, a school may want to create or join into a consortium.

A smaller consortium of schools that are evident in various areas of South Dakota all achieve many goals for distance education. As observed in the previous literature review, a great number of factors must be present for effective distance learning to be effective. A consortium can aid in the accomplishment of these factors. First, with a smaller group of schools, the administrators can collaborate on management, including the schedule, cost of the class, the wages for teachers, the distribution of materials, rules and guidelines, and similar matters. Since the consortium usually involves schools in a proximate area, the students involved may already know each other somewhat because of their involvement and competition in other school activities. The teacher may already know some of the distance students. In addition, the teacher can more easily meet

physically with distance students in a consortium. Teachers quite often can attend extra-curricular events and see distance students as well as their own classroom students. Therefore, in a consortium, the lack of confidence and unease with teachers may not have to be addressed at the extent it would outside of a consortium.

John Heemstra, Ed. (Personal Communication, March 19, 2002), SIVN consortium coordinator and presently advisor for Northern State University's E-Learning Center, stated that schools are more likely to use video distance learning when they are part of a consortium. He bases his observations in the state's use, but indicates, as this study does, that hard data backs it up. Schools who are used to working together in other areas of sports and academic activities are more prone to work together with distance learning. Heemstra adds that several schools are highly involved with distance learning that are not part of any organized group, but it takes more effort to locate class providers, learn about the host school and policies, and form the trust needed to take a class via distance.

As predicted by so many technological gurus, distance learning is becoming a predominant alternative style of education. South Dakota desires to stay on the forefront of education, and Governor Janklow's wiring of the schools and placement of distance learning equipment has kept the state's schools in technological order. In South Dakota, as indicated in this study, distance learning in South Dakota is not a luxury to education, but a necessity because of the rural, geographic location of so many small towns. Through distance learning, students can take courses never before available. Distance learning has given South Dakota's students opportunities that they have never had before. School administration must utilize their distance learning opportunities. For many of these schools, the creation of a distance learning consortium benefits the school, the teachers, the parents, and most importantly the students and future leaders of our state through the use of distance learning.

Appendix A: Survey: Consortium in Distance Education

1. Does your high school have a working Digital Dakota Network (DDN)?

2. Does your middle school have its own working Digital Dakota Network in addition to your high school?

3. Does your school use the DDN to teach classes to other schools?

    a. If so, what and how many classes does your school teach over DDN?'

    b. Approximately how many outside students do you teach in your DDN classes?

4. To what schools do you teach classes over the DDN?

5. How many dollars per class do outside students pay to take DDN classes from you?

6. How did your school get started teaching DDN classes?

7. Do you anticipate teaching more or fewer classes over DDN next year?

8. Does your school use the DDN to receive classes?

    a. If so, what and how many classes do you receive?

    b. From which schools do you receive classes?

9. How much do your students have to pay to take a class over DDN from another school?

    a. Approximately how many students at your school receive classes over DDN?

10. Is your school part of a consortium? In other words do you have certain schools you exchange classes with over DDN?

11. If your school is part of a consortium, what other schools participate in your consortium?

12. Do you have policies (rules and procedures that the consortium schools have to follow) that you would be willing to share with me for my research? If you have a long detailed policy, I can get that from you later.

13. How did you get your consortium going?

14. What other uses do you have for your Digital Dakota Network? For example, do teachers or students take college courses or does the community use the DDN to conduct meetings?

Table 1

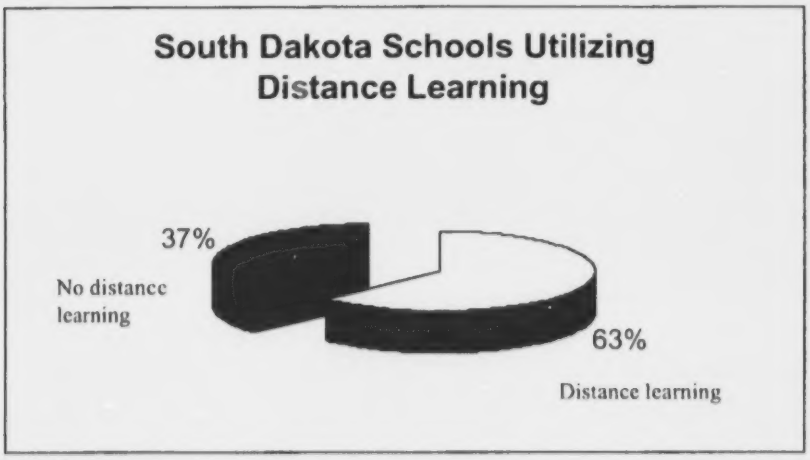
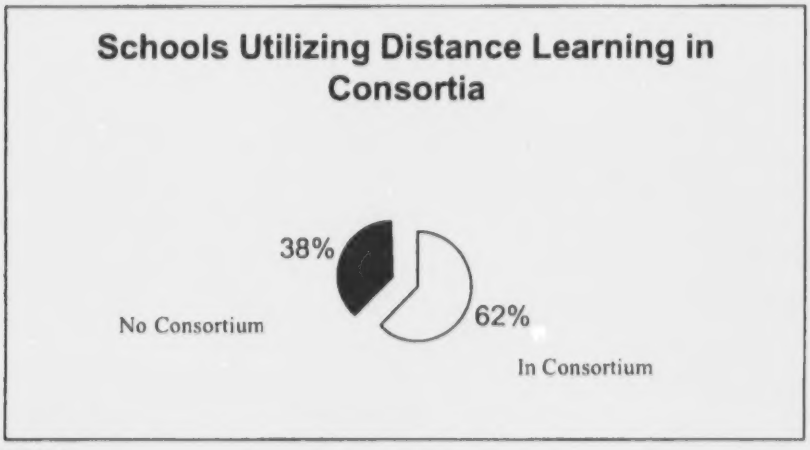


Table 2



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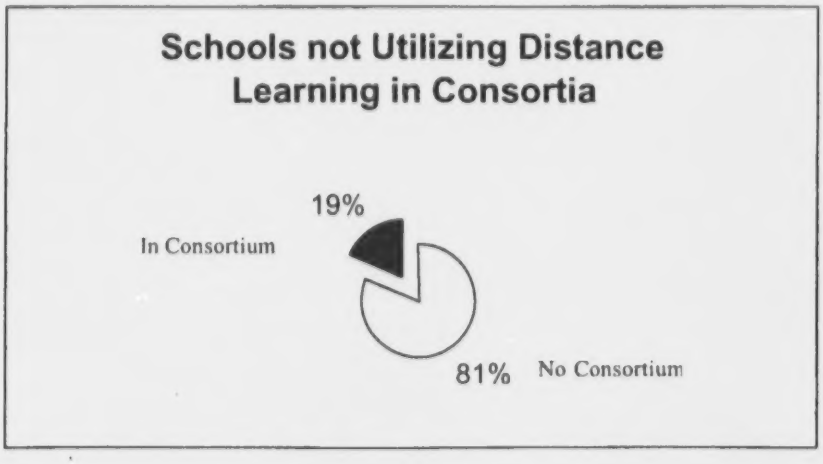

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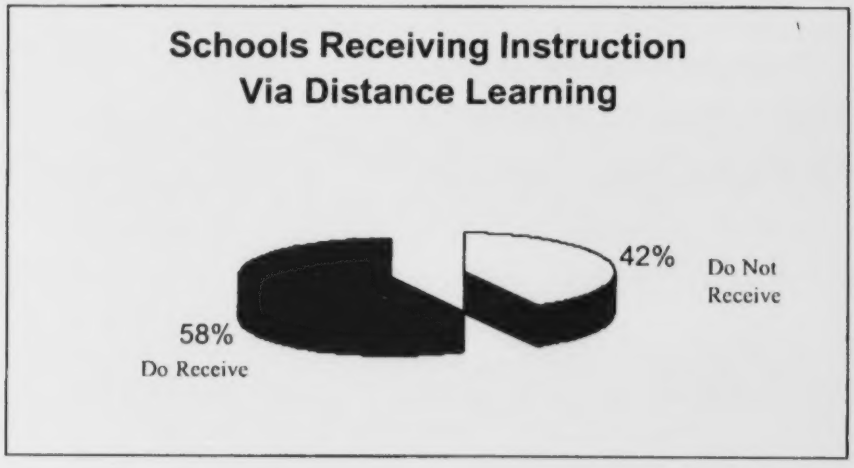

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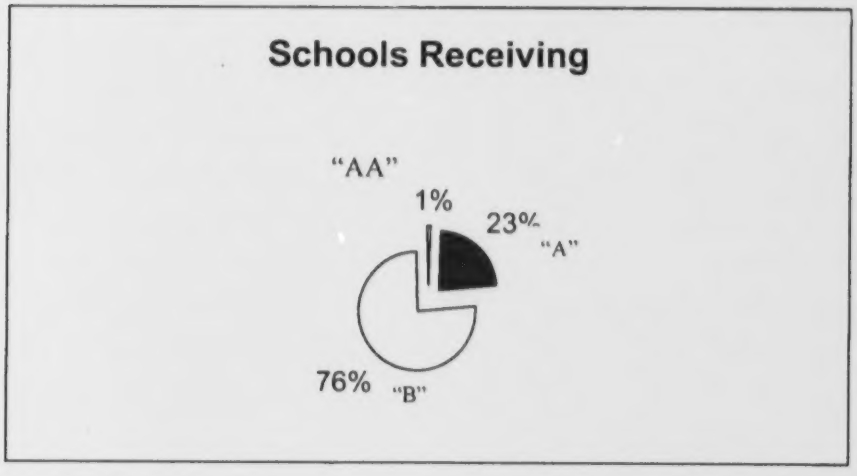

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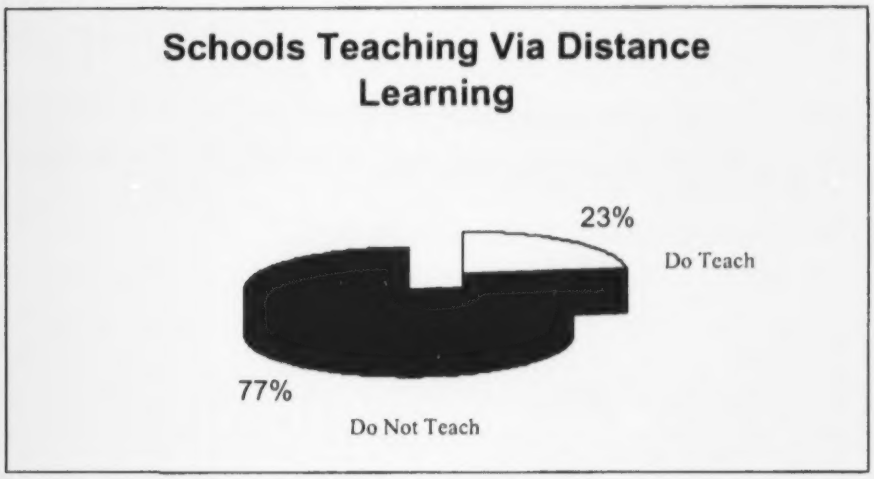

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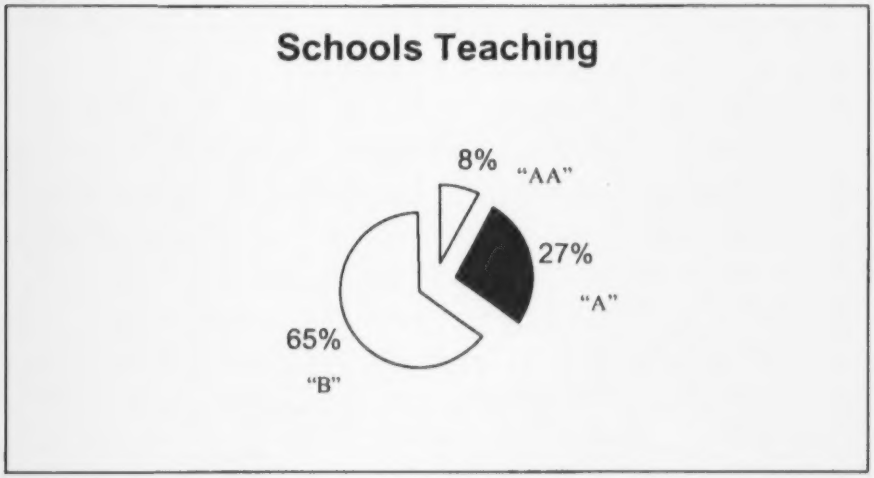

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Distance Education and Special Needs Students

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Abstract

This article discusses the effect of Braille instruction for families of students who are blind or visually impaired. Families not instructed in the use of Braille have difficulty providing support at home for their children who read Braille. Family members benefit from knowledge and resources provided in innovative approaches to direct Braille instruction. Given training, families are able to assist their children with Braille. This study focuses on the opportunity and results of delivering a Braille class to parents, teaching assistants, and consumers across the State of South Dakota through a distance-learning network. The teaching process was designed to improve the Braille literacy of children through family Braille instruction. The family and other participant attitudes, reflections, and improvement in Braille reading at home are all reported in this study.

Introduction

Families of children with visual impairments often do not have the skills necessary to assist their children in Braille reading. Historically, teachers of visually impaired students have emphasized instruction of the student and not the parent. This study examined the effect of direct Braille instruction for families and other service providers for students with visual impairments. The following research reviews family and Braille literacy, family-teacher partnerships, and the need for Braille in the expanded core curriculum.

Families and Braille Literacy

Craig (1996) reaches several conclusions related to literacy and family support of children with visual impairment. Parents of children with visual impairments regard learning to read and write a priority in their child's development, but they may lack the knowledge and resources to facilitate this process. The findings of the study also suggest that special education programs have the responsibility to provide equipment and material for use at home. In addition, parents need a solid background in the type of reading and writing that is done at home. Craig notes statistical differences in the reading activities of print and Braille readers. Braille readers choose books less often to read or to read aloud to their parents. He also notes that reading and writing is less of a priority in the homes of children with visual impairments and children with additional disabilities. Given this research it is important to note that family knowledge and the right equipment to provide exposure to the Braille reading medium is imperative to foster development of appropriate and meaningful early emergent literacy experiences.

Milian's research (1999) states that teacher-training programs need to develop more courses that will improve teacher knowledge of issues relating to family involvement and the importance of families. Furthermore, teachers need to be truly committed to working collaboratively with family members. Parents in this study rated themselves low in their ability to help their children who read Braille with reading and math.

Fellenius (1999) concentrated on the reading environments of Swedish students at home and demonstrated that reading does not just happen:

> Children who are visually impaired have less exposure to incidental reading that leads to reading development than do sighted children, especially at home. Increasing the opportunities for reading and creating or maintaining interest in reading without too great a physical effort is an important job of professionals, together with the children, in interaction with the home and school. (p. 222)

Fellenius states that there is a substantial risk of children with visual impairments becoming "reading evaders" throughout their early elementary experiences.

Family Teacher Partnerships

Bishop (1986) and Turnbull (1990) state that responsibilities need to be shared with families. The importance of communication with families is a key element of student achievement and family satisfaction.

Holbrook (1996) cites the idea that professionals are available to help families reach goals for their children and to look for advice. A parent statement in the book provides a reflection upon the importance of Braille for families.

> We started a Braille class for parents. We could meet once a week and the purpose of the class was to meet once a week to learn Braille but it turned into so much more. I couldn't believe how much support we all gave each other. At Christmas we Brailled the gift tags for the presents under the tree. It was great for our children to figure out which presents were theirs! (p. 156)

Conley (1997) suggests that parents play a critical role in their child's education. Conley goes on to say that parents are partners with teachers in successful schools.

Bjorck-Akesson (1995) indicates that collaboration with families requires a different set of skills than does working directly with the child. Professionals need strong communication skills, rapport, and an ability to determine family strengths and needs. Thompson (1997) states that empowerment happens when families are confident that they have the information and problem solving skills that are obligatory in their personal situations.

The Need for Braille and the Expanded Core Curriculum

Hatlen (1996) indicates that most professionals firmly believe that visually impaired students need supplementary curriculum that requires additional areas of learning. Corn, Hatlen, Huebner, Ryan, and Siller (1995) suggest that parent involvement is a desirable aspiration based on the goals of the National Agenda for the Education of Children and Youths with Visual Impairments Including Those with Multiple Disabilities.

Corn and Huebner (1998) indicate flexibility in service delivery and innovative partnerships with others may be a way to provide the time and resources that are necessary to best serve learners with visual impairment. Family partnerships are cited in the article as one way to stretch the available school resources.

Koenig (2000) studied characteristics of high quality Braille literacy programs. The rationale for the study was to assure that students receive appropriate levels of support and service to ensure progress in Braille reading. Based on the research findings, an important student need is to have family support for Braille reading in the home. Rex, Koenig, Wormsley, and Baker (1994) suggest daily Braille instruction for at least one and one half-hours to two hours per day is necessary to improve reading literacy. Given this research it is easy to see how a teacher with a large caseload of Braille readers may need assistance along the way.

Huebner (2000) outlines ideas for finding the time to teach the expanded core curriculum. Her findings suggest developing shared responsibilities with parents is a way to expand time commitment to Braille.

Family support of Braille literacy for their children may be one of the most important factors in developing readers with positive attitudes and a voracious need to gain information through the use Braille.

Method

Research Questions

What impact does Braille instruction for families and educational service providers via the statewide distance-learning network have on support of Braille reading for blind and low vision learners? Do the attitudes and perceived abilities of class participants' change as a result of direct instruction in reading and writing Braille via distance education?

Participants

The primary focus of this study was an investigation of the effect that Braille instruction had for families of students with visual impairments. Also included in the study were educational service providers and those taking the course on Braille instruction due to personal interest. Specifically, family and other participants' attitudes and perceived abilities in using Braille were researched. The rationale for this study was to promote collaboration between families, schools, and children. Participation in Braille reading through direct instruction was designed to improve confidence, attitude, and abilities in relationship to the Braille code so that those most directly involved with children are more capable of helping children with visual impairments.

Participants in the study included parents of young visually impaired or blind children who read Braille. Family members in the course and research project included four mothers and one father of preschool through upper elementary age children. Five female Special Education Instructional Assistants were either working directly with Braille readers or were expecting to be involved with incoming Braille students. One female took the course because of personal vision loss and one female participated because of personal interest. Four individuals from the sample are working toward Library of Congress Braillist certification.

Procedure

The course on Braille instruction was taught over a nine-week period providing participants with practice reading and writing Braille, using Braille resources, and viewing technology. Given the sparse population of South Dakota and elsewhere, the vast distances that must be traveled, and the low incidence of blindness, there is much to overcome if families truly have an aspiration to learn Braille for the sake of their children. Because of these factors distance education via the Dakota Digital Network (DDN) was employed to deliver the course instruction

The DDN is a state supported digital communication system that delivers high-speed data connectivity to virtually all public schools in South Dakota. The objectives of the DDN are to provide a statewide educational delivery system to share educational resources and remove geographic barriers to instruction.

Instrumentation

There were three primary approaches to collecting information to measure effectiveness of course instruction in changing participants' attitudes and perceived abilities in helping children read and write Braille. The first method was pre and post-course Likert Scales developed by the authors (Appendix A). The second method was teacher observation and recording of data collected from participants during Braille instruction. The final method of collecting information was participant's qualitative responses to survey questions developed by the authors (Appendices B and C).

Data Collection

Explanation of the study and permission to participate was obtained during the first class session. Each family member and all other participants who granted permission received stamped self-addressed envelopes in which to return permission forms and other survey data throughout the direct instruction portion of this study.

Recording of anecdotal data and surveys from the Braille course members assisted the instructor to gauge understanding, answer specific questions, and gain insight into member satisfaction and comfort with the Distance Delivery system and course content. Students were encouraged to write specific questions, observations, feelings, and suggestions for improvement of course delivery and content so that the course could be changed along the way using current and relevant student feedback. Given the vehicle of distance education, feedback must be structured and actively sought after by the instructor to be effective.

A pre-instruction Likert Scale (Appendix A) was distributed to all class members before the first class session. The post-class Likert Scale was again distributed and completed by participants' following the last class session. The scale concentrated on family and other service provider perceived skill level and attitude changes specific to Braille use and understanding, along with perceived ability to help children with Braille reading and writing. Pre and post Parent Surveys (Appendix B) were also completed using the same time lines with only the parents completing this activity. A course follow-up questionnaire (Appendix C) was sent to all respondents within two months of course completion.

Data Analysis and Interpretation

The Likert Scale measuring family and other participant attitudes toward Braille were compared using a pre-treatment and post-treatment method. Descriptive statistical analysis was used to describe on average the change in attitude given the survey results. The mean and standard deviation was calculated and compared.

Patterns that could be generalized among respondents' were analyzed and collected through coding, given the results of questionnaires and reflective writings.

The follow-up questionnaire was structured so that respondents had the opportunity to answer how and why questions, which were open-ended and conceptually based to challenge the thinking of the adults who received direct Braille instruction.

Results

The sum of the responses on the items of the Likert-scale survey was recorded for each participant. A t-test, conducted to compare the means of these sums for the pretest and posttest, was found to be significant ($a < 0.01$), indicating that there had been a substantial gain in participants' attitudes and perceived abilities in assisting children with reading and writing Braille. In addition, the mean of the responses for each item of the Likert-scale survey was computed and a separate t-test used to compare pre- and posttest results. On nine out of ten items there was a statistically significant change ($a < 0.01$) in the participants' level of responses. A summary of this information is found in *Table 1.*

Table 1

Item Number	Pretest Mean	Pretest Standard Deviation	Posttest Mean	Posttest Standard Deviation
1: Braille resources	3.00	1.61	5.70	0.67
2: Teaching Braille	2.64	1.86	5.10	0.88
3: Technology	4.82	1.25	5.40	0.52
4: Reading Braille	1.82	1.66	4.00	0.84
5: Writing Braille	1.82	1.66	4.60	0.84
6: Using Brailler	2.27	1.85	5.80	0.42
7: Certification standards	1.91	1.58	4.80	1.23
8: Braille in schools	3.00	1.84	5.25	0,92
9: Helping children	1.91	1.81	5.20	0.79
10:State/national resources	2.00	1.33	4.95	1.12
11: Total score	25.55	14.05	51.20	5.07

The following qualitative information from recording anecdotal data and surveys (Appendices B and C) is representative of responses provided by participants in the Braille instruction course:

"I am excited about a new door that is now opening in a new world of communication with my child. We are bonded and close already, but learning Braille

opens a whole new world for learning and communication. We will be in the same world."

"Once I learn Braille, I will read with (name) on a daily basis."

"This class has helped me learn to help my child with Braille which is great! Before this, I was confused. It has been fun and I want to keep it up and learn more."

"I know now, how much there is to learn and how my child learns it at school."

Discussion

Many children who are blind or visually impaired use Braille throughout the school day, but when these children get home from school their parents might say, "Sorry, I can't help you. I don't know Braille". This type of parental response was the primary reason for developing this Braille course and teaching it statewide via the distance education system in the schools. It is clear from the results of the study that there was a feeling of triumph on the part of the parents and a pride in their new Braille skills. The most pleasant surprise was the attitudinal change of the children of the families.

During Braille sessions with these children it became evident that their motivational level had increased. The students would say, "Wow, my mom is learning Braille." "My dad has a Braille writer." The children were excited about their moms and dads learning Braille, which became an opportunity to reinforce the importance of Braille for these children. Some children said that they would like to continue to teach their parents Braille. The distance course for families became an opportunity to reinforce the significance of student achievement at school and to strengthen the emotional and academic bond between child and parents.

The success of this study suggests that professionals in the field of Braille instruction could consider using this approach to instructing families of children with visual impairments. It is further suggested that future research may center on the longitudinal impact of direct Braille instruction for families on the Braille literacy of children.

This study examined the provision of resources and the resulting positive effect on family and service-provider attitudes toward the use of Braille. Teaching families and others Braille to support children is an intelligent use of resources.

The limitations of the study included the small sample size of volunteer participants, lack of parent familiarity with the distance learning technology, and the availability of technology for replicating a similar study.

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Appendix A

Likert Scale
Braille for South Dakota Families, Teachers, and Students

I have the necessary resources to find information about Braille letters, contractions, words, and numbers.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I could be helpful to a person learning Braille.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
Technology should be used to enhance not replace Braille
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I feel confident in reading Braille exercises.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I feel confident in writing Braille exercises.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I could show a person how to use a Brailler.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I am knowledgeable about how to become a state or nationally certified Braillist.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I am aware of how Braille is taught in the schools.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I am able to help my (son/daughter/student/friend) learn to read and write Braille.
Strongly Disagree Strongly Agree
1 2 3 4 5 6
I am informed regarding state and national resources for finding Braille materials.
Strongly Disagree Strongly Agree
1 2 3 4 5 6

Appendix B

Parent Survey

How much Braille reading does your child do at home? Please include the number of minutes per day at the present time and anything else that you can add about reading at home

Does your child read independently at home? Please include the number of minutes per day that your child reads independently at home and anything else that you may want to add about independent reading.

How much are you involved with your child's Braille reading at home?

Appendix C

Braille for South Dakota Families, Teachers, and Students
Final Survey

Please place your date of birth month and day in the upper right hand corner of this survey. Thanks so much for your effort in class and in providing complete research information. Please return this form in the enclosed self-addressed envelope by Friday, May 24, 2002. You may write your answers on the enclosed paper. Make sure to number your paper.

1. How did the resources about Braille letters, contractions, words, and numbers assist you as a result of your participation in the DDN class?
2. Why do you think you could be more helpful to a person learning Braille now?
3. How do you feel technology can be used to enhance Braille for readers?
4. Why do you feel more confident in reading Braille now?
5. Why do you feel more confident in writing Braille now?
6. How do you feel that your ability to show a person how to use a Brailler has been enhanced as a result of your membership in class?
7. Why did you become more knowledgeable about Braillist state and national certification standards?
8. How has your awareness of how Braille is taught in the schools been expanded?
9. How has your ability to help someone read Braille been improved as a result of this course? This could be you, a son, daughter, parent, client, or student.

How has your knowledge about how to locate Braille materials become better as a result of this course?

Distance Education Needs, Interest and Opportunities For Rural South Dakotans

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Introduction and Statement of the Problem

There is a continual need for adults to increase their job security, income and interest level in their field of work. South Dakota is a very rural atmosphere and the target area of Colome, Gregory and Burke is a prime example of rural. There have been many people that have approached me wanting to take courses for technology instruction at various levels. Some are just desiring to learn how to turn on their newly purchased computer, others would like to obtain college credit for a course and possible work toward a degree. The problem is that none of these people are able to drive the many miles and hours that it takes in order to attend a university setting. Therefore, this study will determine the opportunities, accessibility and interest levels of distance education programs for those adults living within the target area of Colome, Gregory and Burke. Objectives of this research project are:

1. To determine partnership opportunities between school and community for adult distance education programs in the target area.
2. To determine what technology courses are presently being offered to the target area members.
3. To determine what technology equipment is available for distance education courses to be offered to adults in the target area.
4. To determine the amount and type of distance education courses being taken by adults in the target area.

The purpose of this research is to determine the distance education opportunities available to rural South Dakotans, if there is sufficient technology available to them to take distance courses, as well as classes being offered for them to learn how to use the technology. This research will be useful to distance learning providers, rural communities, and state organizations planning for the development of distance education within rural communities and their schools in relaying how effective distance education is for rural South Dakotans. The school districts and community development programs will be made aware of the educational needs of their educational staff and community members. The results that will be presented will benefit the universities and other distance education programs by showing the needs and interest levels of the adults in the target area. The biggest result is in demonstrating what segments of the population are missing out on these opportunities and how delivery might be made to them.

Review of the Literature

The following literature reviews offer the characteristics of adult learning and information provided on adult learning theories in order to reach our target area and make their learning environment the best it can be. It also discusses the types of distance-learning providers that are available nationally and within South Dakota.

Many people that live in rural areas are continually wanting a better paying job. They are interested in taking classes to begin or develop their degree or even for enjoyment purposes but are unable to due many factors about the learners' lives that are common in the post college age group. There are many consideration that need to be viewed when trying to implement a successful adult education program. According to H. L. Bee middle class adults, as a group, marry later and have fewer children than do working-class adults. This correlates to the research that participation in adult education classes for job-related and basic skills reasons is by lower socioeconomic classes. Those from higher social classes seek education to satisfy achievement and self-realization needs (Miller, H. L.).

Ron and Susan Zemke have determined that there are a variety of sources that provides us with a body of fairly reliable knowledge about adult learning. Three basic divisions are shown below in regards to adult learners.

Motivation to Learn

Adults seek out learning experiences in order to cope with specific life-changing events—e.g., marriage, divorce, a new job, a promotion, being fired, retiring, losing a loved one, moving to a new city.

The more life change events an adult encounters, the more likely he or she is to seek out learning opportunities. Just as stress increases as life-change events accumulate, the motivation to cope with change through engagement in a learning experience increases.

The learning experiences adults seek out on their own are directly related - at least in their perception - to the life-change events that triggered the seeking. (Zemke, 1984)

Curriculum Design

Adult learners tend to be less interested in, and enthralled by, survey courses. They tend to prefer single concept, single-theory courses that focus heavily on the application of the concept to relevant problems. This tendency increases with age.

Adults need to be able to integrate new ideas with what they already know if they are going to keep - and use - the new information.

Information that conflicts sharply with what is already held to be true, and thus forces a re-evaluation of the old material, is integrated more slowly. (Zemke, 1984)

In the Classroom

The learning environment must be physically and psychologically comfortable; long lectures, periods of interminable sitting and the absence of practice opportunities rate high on the irritation scale.

Adults have something real to lose in a classroom situation. Self-esteem and ego are on the line when they are asked to risk trying a new behavior in front of peers and cohorts. Bad experiences in traditional education, feelings about authority and the preoccupation with events outside the classroom affect in-class experience.

Adults have expectations, and it is critical to take time early on to clarify and articulate all expectations before getting into content. The instructor can assume responsibility only for his or her own expectations, not for those of students. (Zemke, 1984) Dorothy Billington did a research project to determine the best learning environment for adults. Her results showed that adults can and do experience significant personal growth at midlife. The research she conducted determined that adult students grew significantly only in one type of learning environment; they tended not to grow or to regress in another type. The seven key factors found in learning programs that stimulated adult developments are: (Billington, 1996)

1. An environment where students feel safe and supported, where individual needs and uniqueness are honored, where abilities and life achievements are acknowledged and respected.
2. An environment that fosters intellectual freedom and encourages experimentation and creativity.
3. An environment where faculty treats adult students as peers—accepted and respected as intelligent experienced adults whose opinions are listened to, honored, appreciated. Such faculty members often comment that they learn as much from their students as the students learn from them.
4. Self-directed learning, where students take responsibility for their own learning. They work with faculty to design individual learning programs that address what each person needs and wants to learn in order to function optimally in their profession.
5. Pacing, or intellectual challenge. Optimal pacing is challenging people just beyond their present level of ability. If challenged too far beyond, people give up. If challenged too little, they become bored and learn little. Pacing can be compared to playing tennis with a slightly better player; your game tends to improve. But if the other player is far better and it's impossible to return a ball, you give up, overwhelmed. If the other player is less experienced and can return none of your balls, you learn little. Those adults who reported experiencing high levels of intellectual stimulation—to the point of feeling discomfort—grew more.
6. Active involvement in learning, as opposed to passively listening to lectures. Where students and instructors interact and dialogue, where students try out new ideas in the workplace, where exercises and experiences are used to bolster facts and theory, adults grow more.
7. Regular feedback mechanisms for students to tell faculty what works best for them and what they want and need to learn—and faculty who hear and make changes based on student input. (Billington, 1996)

The learning programs that the students feel unsafe and threatened, are viewed as underlings, and where life achievements not honored students tend to regress developmentally, especially in self-esteem and self-confidence. The programs that require students to take identical lockstep courses, whether relevant to professional goals or not, and where they are often expected to spend several years working on a dissertation that is part of a professor's research project instead of on a topic of their choice, they grow less. In other words, students grow more in student-centered as opposed to faculty-centered programs (Billington, 1996). There are many people in the target area that are

looking to improve their position at work or to make more money and are willing to participate in courses that will help them to do so, but time and money are issues hindering their progress. The increasing number of adults in our society is an influencing factor in the need for learning activities based on that population. There is a rising level of educational characteristics amongst the United States' population. Over 80% of today's twenty year olds have completed four year of high school compared with less than half (49%) of those in their grandparents' generation (Mercer and Garner, 1989). The Center for Educational Statistics show that this graduation increase effects the participation in adult education – Chart 1-1:

There are many opportunities available for those people wanting to increase their academic level without having to make huge alterations to their lives. Distance education provides rural community members with this option. According to the Council for Higher Education Accreditation there are essentially four types of distance learning providers: the military services; corporate universities; unaffiliated distance learning providers; and postsecondary providers. (Merisotis, Phipps, Wellman, 1998)

The Military Services

The U.S. Army is embarking on the most ambitious undertaking of all of the armed services, dedicating $840 million over a 13-year period to provide global access to training through distance learning. The goal is to use distance-learning methods to improve efficiency and effectiveness of military training. Using the full range of technology options, the Army intends to design 35 courses during FY 1998 and develop a total of 535 courses by FY 2003, in addition to building 204 facilities and 745 classrooms. (Merisotis, Phipps, Wellman, 1998)

Corporate Universities

A large application of distance learning today is employee training. In 1995, over $50 billion was spent on training by employers. Though estimates suggest that as many as 1,000 corporate universities exist, the extent to which the corporate sector is using distance learning is difficult to ascertain. Most corporate universities share two common goals: to train all of their employees, not just their professional managers, and to view training as a way to inculcate key stakeholders in the vision, traditions, and culture of the organization. (Merisotis, Phipps, Wellman, 1998)

Unaffiliated Distance Learner Providers

A variety of learning activities are available, primarily through the Internet that are not associated with any postsecondary institution. The major difference between these unaffiliated learning activities and other kinds of distance learning is that they are not credit bearing, degree, or credentialing programs. (Merisotis, Phipps, Wellman, 1998)

Postsecondary Providers

Both collegiate higher education institutions, as well as other entities, provide instruction to degree- or credential-seeking students through learning activities that are typically organized in courses for some form of academic credit. According to a Fall 1995 National Center for Education Statistics survey, a significant number of institutions are attempting to address distance learning. Thirty-three percent of higher education institutions offered distance education courses and another 25 percent planned to offer such courses in the next three years. Twenty-three percent of the institutions that offered distance education courses offered degrees which students could complete by taking distance education courses exclusively. An estimated 753,640 students enrolled in

distance education courses in academic year 1994-95. (Merisotis, Phipps, Wellman, 1998)

There are many opportunities available within South Dakota based of off the efforts to develop distance education within the state. The South Dakota Board of Regents put out a news article indicating that the universities in South Dakota continue to increase the availability of distance education courses. The number of individuals who took one or more distance delivered courses during the 2001 Summer semester was 1,295. This is an increase of nearly 20% from the previous summer (see chart 1-2) (Mercer, 2001).

During the 2000 Summer semester 82 distance education courses were offered by the regional universities. The number of courses offered in the 2001 Summer semester increased 37%, a total of 130 courses were offered (chart 1-3). (Mercer, 2001)

As the availability of courses increased so did the number of individuals taking courses. For South Dakota residents there is a 19.8% increase in students taking distance education courses from 2000 to 2001 (chart 1-4). (Mercer, 2001)

The Dakota Digital Network (DDN) has an information based website that allows the viewer to find out about offered courses. These courses vary from high school courses to college credit courses. The site provides a variety of information that is distance learning based. There are ITV, PBS and WebCam based offerings as well. The website is: http://www.ddnnet.net/ and is a great resource for school and community members.

The South Dakota Alliance for Distance Education (SDADE) has 6 goals to enhance technology within South Dakota school systems and communities:

Goal #1: Education using the Digital Dakota Network will be UNDERSTOOD and ACCEPTED by South Dakotans.

Goal #2: South Dakota educators will be PREPARED and SUPPORTED so they can effectively teach students at a distance.

Goal #3: South Dakota schools will be CONNECTED to the DDN.

Goal #4: Instruction will be OFFERED and access to instruction INCREASED using the DDN, especially in needed subjects such as mathematics, sciences, foreign languages, and literacy.

Goal #5: A program of RESEARCH and EVALUATION will be established to document the impact and effectiveness of the DDN and the distance education efforts underway in South Dakota.

Goal #6: The South Dakota Department of Education and Cultural Affairs will manage the South Dakota Star Schools Project. (Sdade, 2001)

The implementation of these goals can be seen throughout the State as SDADE has connected the schools in South Dakota with the DDN system. There have been multiple opportunities for teachers to be educated on the use of the DDN system as well as to be able to implement the programs offered through the DDN into their classroom.

Another opportunity that allows the target area members to develop their technology skills and utilize distance education opportunities is through the Interactive Learning Consortium (ILC). The ILC has 3 different cohorts of adult students working on their master's degree and have assisted them with the payment of the programs. There are

25 students working through the University of Nebraska Lincoln, 24 students working through the University of South Dakota and 23 students working through Dakota State University (DIAL). LOFTI stands for Learning Organizations for Technology Integration. LOFTI is a $10 million federal technology challenge grant administered through the Department of Education. The TIE Office, Technology Innovations in Education, administers the grant for the state of South Dakota. They are to develop teacher technology skills.

The Technology Skills Development work area has the following priorities:

To promote the use and understanding of distance education, specifically using the VTEL system or DDN
Day-long introduction training
Two summer in-depth training
Offer training experiences with web development and web based learning
Web development courses: fall, spring, summer
Web CT & Blackboard training
Continue on going professional development opportunities on the basic technology skills.
Tech training mini-grants (Lofti, 2002)

There is evidence of a great momentum going for the LOFTI project throughout the consortium. The efforts to provide educators with basic skills have been widespread and successful. There have been some efforts to begin working with technology and curriculum integration. The desire by consortium participants in year-three is to shift the emphasis from technology skills training to the integration of technology into the curriculum. (Lofti, 2002)

The DIAL Consortium is one of the 16 learning organizations involved in the LOFTI project throughout the state. There are twenty-six school districts in the DIAL consortium involved in LOFTI activities. The consortium has created some positive relationships that have led to the emergence of new ways of collaborating, communicating and conducting professional development.

Explanation of Methods Used

One method used to determine the objectives has been to survey a variety of rural community members to obtain their views and knowledge of on-line courses and the DDN. Teachers and administrators from various rural school districts have been surveyed to evaluate their knowledge, interest level and views on the opportunities of on-line courses and DDN courses available to them, as well as what is being offered for adult education within their districts. Local community development and adult education program coordinators have been surveyed to find out what involvement their programs have had with distance education opportunities and what technology opportunities are offered through their programs for their community members. Statistical information has been obtained from the South Dakota Electronic University Consortia that details the numbers and educational fields that adults from the target area are involved in through distance learning. All collected information has been analyzed and categorized into charts and tables to relay the information effectively. The information obtained from the

research has been passed on to stakeholders in order to assist them in their adult education efforts.

Qualitative research of rural adults in the target area has been done to determine the levels of satisfaction in regards to adult educational opportunities available, distance education programs presently being taken and community/school partnerships dealing with adult distance education. There has also been qualitative research of teachers and other professionals in the target area regarding the DDN system and how it can be more effective to their continuing education needs. A needs assessment has been implemented to determine the courses that would benefit adults in the target area. Quantitative research has been done to relay the areas of awareness and interest of rural South Dakotans in regards to distance education. There has also been statistics provided displaying the amount of technology equipment that is accessible for adult distance education in the target area. A focus group meeting was held in order to determine the level of knowledge and interest in technology within the target area.

The community members were gathered for a focus group meeting. This meeting served multiple purposes. It allowed the community members to become more aware of the distance education opportunities available to them within their communities and within South Dakota. School. It provided them with a forum to voice their opinions on technology development and the community. The information gathered at the meeting was relayed to the Interactive Learning Consortium (ILC) that is working to implement technology and distance education programs into rural South Dakota.

The teachers at each site were asked to fill out a survey about their knowledge, interest level, participation in and use of technology. The survey was shared with the ILC. This survey provided a rich source of information for this project.

The research done has involved courses that are taught on-line as well as those distributed through the Dakota Digital Network (DDN). This research has been connected to assisting our teachers and community members in continuing or beginning their education efforts via distance learning options within South Dakota and the target area. There have been efforts made to partnership the school's technology equipment to the community member's needs. A needs assessment has been distributed to determine the target area's needs in regards to distance education.

Results of the Study

The efforts made by the Electronic University Consortium have reached out to few in the target area. According to secretary Suzanne Aberle, there has been only one person from the target area that has taken a course through the distance classes that they have offered since 1997.

The 21st Century Community Learning Centers (21st CCLC) has 17 schools that are considered the mid-central cluster. These centers are funded by a federal grant to develop programs for the community and school. Their website is available at www.tech4learning.org/e3. These 17 schools each have an individual that is titled the site coordinator who develops and implements programs for the school. The site coordinators collaborate on a variety of levels, swapping ideas for programs and solutions for difficulties. Each month the coordinators meet to discuss programming and deal with administrative issues. Amongst the incorporated programs that are required by the grant

are adult education courses. Many sites have worked to incorporate technology classes for adult education. Chart 1-5 shows the results of a site coordinator survey from January 15, 2002.

This information shows that there is a need and an interest in technology within rural South Dakota. The average number of students for an introduction to computers class is around 12 adults. Considering that the size of most rural schools' computer labs fits 15 computers, this is a very impressive number.

Colome's 21st Century grant offered 4 adult computer courses from February 4th – March 21st, 2002 serving over 33 people. The courses focused on the fundamentals of computer and internet usage. 15% of the people that came to the class offered for adults 45 years and older did not even know how to move the mouse on the computer screen. More than 60% of the adults had their own home computer, but were interesting in learning how to use it more effectively and over 80% were interested in taking the next level of computer class.

The faculty of the target area schools was surveyed to find out the amount of technology skills each had and had been taking classes to develop. The chart 1-6 represents the information gathered from the survey.

There were 42% of the teachers that had taken university level technology courses. 45% had attended a workshop or training in a technology related field while 44% of the teachers that returned the survey stated that they had attended TTL, DTL, TIL-A, TITLE-NA, or TTL-SA which are South Dakota teacher's technology training courses. These are a very encouraging statistics, showing that our teachers in the target area are attempting to educate themselves about technology. Counteractive to these positive signs are the results that only 1 teacher answered "yes" to considering teaching a class via distance while 10% said that they would "maybe" consider teaching a class via distance. Can it be deduced that our technology training courses are not focusing on teaching our teachers how to teach via distance? It seems that are teacher training is not effectively teaching our teachers to feel comfortable enough with technology that they would go beyond the technology that is utilized in a regular classroom setting or maybe it's not the training, maybe it's the lack of equipment to bridge the teacher and distance students, or maybe the teachers simply lack time. There are many factors that must be taken into consideration in order to develop our teachers' technology skills.

Chart 1-7 is second part to the teacher survey results of Chart 1-6. This chart provides the results of the usage of various modes of technology by the teachers in Burke, Colome and Gregory.

There were 35 teachers, 33% that marked that they had NEVER used the V-tel systems before and only 1 that felt he/she could teach others to use the V-tel system. There were 5% that said they would like training on the V-tel system. I have asked my 7 fellow CET 769 Adult Learning For Distance Education students what they felt was the best mode of technology for distance education courses. There were 5 of the students that responded that DDN (V-tel) was the best mode to use, while the other 2 felt that an internet-based course was the best tool to use. This shows that there is a great need for instructors to learn how to use the V-tel system if effective distance education is to happen in this target area. According to the South Dakota Department of Education & Cultural Affairs (DECA), teachers said, "We want to use computers and other new technologies, but we need time to learn and time to integrate it into our lessons and

curriculum" (DECA, 2002). The research shows that there is a high level of interest in technology related classes and distance education within the target area. It seems that there is a need to educate our teachers more effectively if they are expected to implement more technology in their classrooms. With only one teacher out of the three schools surveyed willing to teach a course via the DDN it would appear that the system is not being used as effectively as the SDADE consortium had planned. The survey relates that our teachers in the target area are well adapted to technology and feel comfortable using many of the basic, yet important features available to them. All had used e-mail, all but one had browsed the internet, and all but eight had used power point. The key aspect is that only 10% of the teachers felt that they could teach power point to another person, but 26% of them use it as a tool. Another vital statistic that should be noted is that out of the 21 technical areas surveyed, there were very few that teachers were interested obtaining training about those areas. Is that due to lack of time, reimbursement for time spent on training, lack of interest in the technology or some other factor?

Through the Electronic University Consortium of South Dakota distance education students, either degree or non-degree seeking students, will be charged $142.25 per undergraduate credit hour and $181.60 per graduate credit hour, regardless of delivery method. These tuition rates are subject to change by the South Dakota Board of Regents. Tuition reduction for special groups in South Dakota (i.e. teachers, National Guard, state employees) does not apply to self-support courses (Electronic Education Consortium, 2002). The CET 769 class stated that a maximum charge of $10,000 for a master's degree distance education program in South Dakota was reasonable. They also felt that a person should be willing to commit 2-3 years time in order to obtain a master's degree via distance education (CET 769, 2002).

Within South Dakota people have the opportunity to learn and obtain their degree via distance. The Electronic University Consortium of South Dakota (EUC) has a website: http://www.worldclasseducation.org that provides a vast amount of information for people who are interested in taking distance education courses. Student resources, financial aid, admissions' requirements and course offering information are available for those interested. The EUC has following degrees available on-line:

Associate Degree

General Studies

Baccalaureate Degree

Health Information Administration
Nursing - RN Upward Mobility

Masters Degree

Administrative Studies
Business Administration
Computer Education and Technology
Educational Administration: Adult and Higher Education
Family and Consumer Sciences, Family Financial Planning Option
Information Systems
Nursing

Technology for Education and Training
Technology Management

South Dakota's six public universities involved in the Electronic University Consortium (EUC) include Black Hills State University, Dakota State University, Northern State University, South Dakota School of Mines and Technology, South Dakota State University, and The University of South Dakota (Electronic Education Consortium, 2002).

The educational opportunities for rural South Dakotans are many. It is a matter of making the opportunities fit into the needs of the consumer. The two most often cited reasons for nonparticipation in adult education are lack of time and money (Valentine 1997). Where one happens to live, what color, age or sex on happens to be, what one does for a living: all contribute to the participation pattern in adult education (Cropley, 1989). Even though people live in rural areas their lives are still very full. Time and money constraints of the adult learner are factors that have to be considered by those offering distance programs to those in the target area. Considering that Gregory county's family average income is $37,000 and Tripp county's family average income is $37,800 (South Dakota State, 2001) there is a need to provide rural South Dakotans with the opportunity to become well educated without having to leave their homes and families to travel great distances in order to do so.

Conclusions and Implication of the Study

Distance education in rural South Dakota has provided people with the opportunity to better educate themselves. These people range in age from the elementary to the elderly stage. With the advantage of the Dakota Digital Network, the 21st Century Grant, the LOFTI grant, the Interactive Learning Consortium, and the teacher's technology workshops there are a multitude of resources that adult can utilize in order to enhance their education and technology skills. There has been quite a bit of partnership created between school and community with the incorporation of the 21st Century Grant and the Interactive Learning Consortium leading the way to make technology courses available to the community members.

There are a variety of courses being offered to the technology area that range from basic computer instruction to advanced degrees. This provides community members with the opportunity to increase their knowledge level and to be able to continue with their education within their daily life schedule.

The implementation of the DDN has created a large area of land to become connected for the benefits of education. The target schools have well-structured computer labs and are internet connected. The technology equipment is in place for those willing to put in the time to develop their education.

There is an obvious need for the continuation of technology education for our target area teachers as they,have indicated that their knowledge level for the various technology fields is at best mediocre across the board of those that returned the teacher survey (see charts 1-2 and 1-3). The connection between teacher interest level and comfort level with technology is vital in their implementation of technology into the classroom. The connection between adult interest level and comfort level with technology is vital in their implementation of technology to develop their education and to take

advantage of the opportunities available to them. The estimated 36 graduates of master's level distance programs within South Dakota will be assisting the State with technology and distance education development as they implement their newly acquired skills into the school systems and communities. There is an increasing amount of advertising being done in the target area on local radio and television, as well as through flyers and school handouts that has attracted the adult to technology and distance learning classes. The implementation of more DDN courses within the school setting will help to create a better awareness of the opportunities available through distance education. The continuation of local, state and national distance education and technology training efforts will be an important factor in the development of rural South Dakota's distance education programs.

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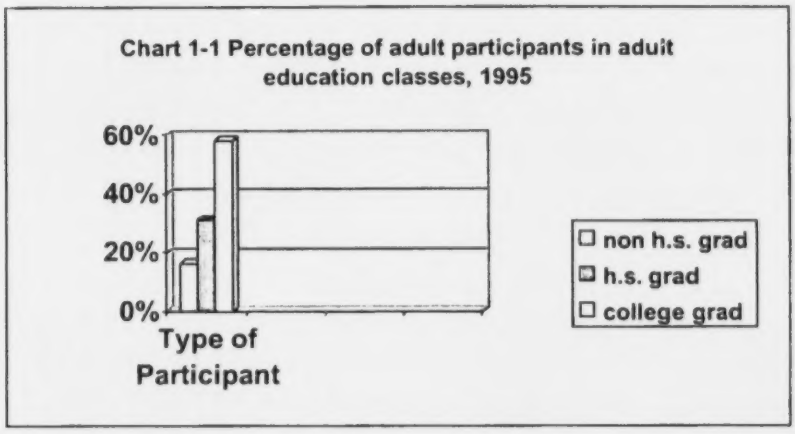
Chart 1-1 Percentage of adult participants in aduit education classes, 1995
60%
40%
20%
0%
Type of Participant
non h.s. grad
h.s. grad
college grad

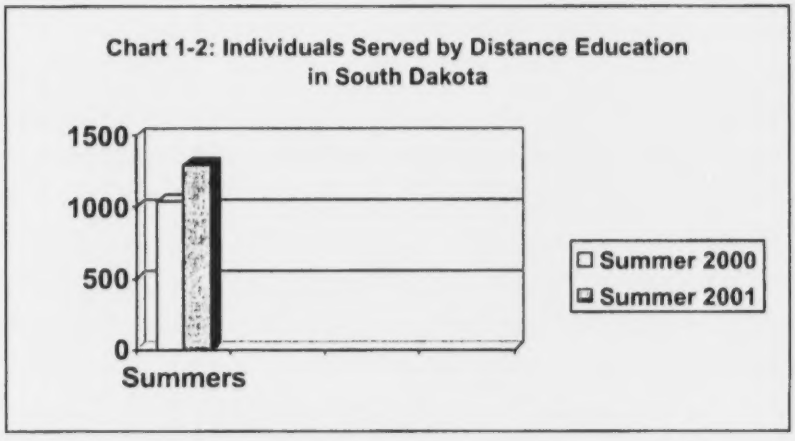
Chart 1-2: Individuals Served by Distance Education in South Dakota
1500
1000
500
0
Summers
Summer 2000
Summer 2001

Chart 1-3	*Courses Offered*		*Registration*		*Credit Hours*	
Delivery Method	2000	2001	2000	2001	2000	2001
Video Conferencing	4	17	112	147		
Internet	61	100	569	672		
Satellite	4	1	42	1		
Television	11	11	101	113		
Video Cassette	2	0	17	0		
Other	0	1	0	4		
Electronic Total	82	130	841	937	3480	4616
Increase		37%		10%		25%

Chart 1-4	*On-Campus*		*Off-Campus*		*On-campus /other Universities*		*UNDUP TOTAL*		
	Students		Students		Students		Students		
	2000	2001	2000	2001	2000	2001	2000	2001	Increase
Resident	138	197	711	876	18	8	867	1081	19.80%
Non-Res.	20	53	149	160	1	1	170	214	20.56%
Total	158	250	860	1036	19	9	1037	1295	19.92%

Chart 1-5. Type of Computer Classes Offered, the Number of Classes Taught and the Number of Adult Participants within the 21st Century Grant Mid-Cluster Schools, 2001-2002.

	Basic Comps	Advanced Comps	Basic Internet	Web Page Design	Word	Excel	Publisher	Multi Media Use
Classes Taught	24	1	7	2	4	4	3	2
Total Adults In Classes	278	2	75	8	56	47	23	10

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		Chart 1-6 *Mid-Central Distance Learning Consortium*			
		Faculty Survey			
		Results Page 1: Burke, Colome, Gregory			
		Recorded frequencies of response:			
Questionnaire			Burke	Colome	Gregory
1	a	What grade level do you teach? Elementary	13	11	3
1	a	What grade level do you teach? Middle School	12	10	14
1	a	What grade level do you teach? High School	13	13	17
1	b	How many total years teaching?	2 to 41	1 to 29	1 to 33
1	c	How many total years teaching?	2 to 40	1 to 29	1 to 30
2		Which of the following best describes your technology training?... I have a degree or certificate in a technology related field.	2	4	5
2		I have taken University level courses in a technology related field.	15	13	17
2		I have attended a workshop or training in a technology related field.	18	13	17
2		I have attended TTL, DTL, TTL-A, TTL-NA, or TTL-SA (circle all that apply)	22	13	15
2		Other – please list	2	2	2
Questionnaire			Burke	Colome	Gregory
4		In thinking about attending a training or professional development opportunity, which of the following best describes your preferences?... Multiple days	8	4	6
4		One full-day	12	16	12
4		Half day	4	3	3
4		After school	3	2	3
4		Fall	9	3	6
4		Winter	7	3	7
4		Spring	7	6	4
4		Summer	12	12	12
5		Would consider teaching a class or unit via distance learning?... No	17	17	17
5		Maybe	5	3	4
5		Yes	1	0	0

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Chart 1-7: Mid-Central Distance Learning Consortium Faculty Survey

	E-mail	Scanner	Digital Cameras	V-TEL	Power Point	Vid Streaming	Web Auth FrontPage	Web Auth Dream Weaver
Burke								
Never used	0	3	2	11	0	10	5	17
Used on occasion	8	15	10	11	6	13	13	6
Use as a tool	6	4	10	1	16	1	4	0
Could teach others	9	2	2	0	2	0	2	1
Would like training	0	1	2	2	0	3	1	3
	E-mail	Scanner	Digital Cameras	V-TEL	Power Point	Vid Streaming	Web Auth FrontPage	Web Auth Dream Weaver
Colome								
Never used	0	5	5	11	4	13	8	15
Used on occasion	6	9	6	8	7	3	6	3
Use as a tool	8	3	6	0	6	0	5	0
Could teach others	6	3	3	0	3	0	1	0
Would like training	0	3	5	3	0	5	1	1
	E-mail	Scanner	Digital Cameras	V-TEL	Power Point	Vid Streaming	Web Auth FrontPage	Web Auth Dream Weaver
Gregory								
Never used	0	4	4	13	4	2	10	20
Used on occasion	6	13	11	9	7	3	7	3
Use as a tool	8	3	4	0	5	1	5	0
Could teach others	11	4	4	1	6	1	1	0
Would like training	0	0	0	0	0	0	0	0

Chart 1-7 cont.: Mid-Central Distance Learning Consortium Faculty Survey

	Spreadsheet Excel	Desktop Publishing	Internet	Web CT	LCD Projectors	PDA Palm, Visor	Graphics Photoshop
Burke							
Never used	0	15	0	0	0	6	17
Used on occasion	12	5	3	6	6	11	5
Use as a tool	9	3	16	16	16	5	1
Could teach others	3	1	5	2	2	2	0
Would like training	0	3	1	0	0	2	1
	Spreadsheet Excel	Desktop Publishing	Internet	Web CT	LCD Projectors	PDA Palm, Visor	Graphics Photoshop
Colome							
Never used	3	6	0	4	4	9	10
Used on occasion	12	10	5	7	7	9	7
Use as a tool	3	1	10	6	6	2	3
Could teach others	2	2	5	3	3	0	0
Would like training	4	4	0	0	0	1	3
	Spreadsheet Excel	Desktop Publishing	Internet	Web CT	LCD Projectors	PDA Palm, Visor	Graphics Photoshop
Gregory							
Never used	1	3	1	4	4	10	14
Used on occasion	9	11	4	7	7	10	8
Use as a tool	8	6	9	5	5	1	0
Could teach others	5	4	10	6	6	1	3
Would like training	0	0	0	0	0	0	0

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If You Schedule It, They Will Come

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Abstract

The action research was designed to determine if middle school teachers, who had never experience teaching a class via distance, would decide to continue to use distance learning after allowing another teacher to set up and control a distance learning experience for their class. The research explores two questions: 1) Will the teachers go to the lab in a non-threatening environment? 2) Will the teachers continue to use the lab if they have experienced distance learning? Fifteen teachers were offered the opportunity and five completed the study. All of the participants in the study decided that distance learning would be a part of their teaching plans in the future. Each indicated that teaching via distance would be used more than once throughout the year.

The data collected was formulated through interviews and an electronic questionnaire. The interviews revealed an overwhelming positive reaction from teachers and students to the distance learning experience. The data also showed that no prior use of the distance learning equipment that was installed in the district was based solely on a lack of instruction in using the system. Once taught the correct procedure, each of the teachers planned to use distance learning as one of their teaching methods. Also found in the interviews and questionnaires were different levels of confidence in using the distance learning equipment. Three of the teachers said they could now teach others how to conduct classes via distance without any further assistance.

The most difficult aspect of the design of the research was scheduling, not the teacher's unwillingness to try a new teaching method. The teachers and the researcher found that the major difficulty in organizing a distance learning class is the coordination of class schedules between two districts. This amplifies a problem, which is underlying all distance learning connections of this nature. Without a consistent schedule between districts, the frequency of distance learning connections will stay relatively low. However, this research indicates that with assistance and instruction some teachers will use distance-learning methods of teaching.

Introduction

Picture this: Twenty-two sixth graders, who are standing next to you, are waving wildly at a classroom that is 200 miles away. They are waving back because class is nearly over. They do not want the class period to end. They still have some things they want to show the other class. They worked hard to prepare their work so the other class

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to could see what they have done. The other class had some cool projects and they were really friendly, too. They are eager for the next session and say, "Thank you, Mr. Hoglund. That was awesome! When do we get to do it again?"

I have always been a teacher who is willing to try new things. A new method of teaching will make me a more effective teacher and could help my students learn thoroughly. Technology, with its countless possibilities, has thrust me to be not only willing to try new things, but to pursue new methods of teaching. I have become driven to learn about tools that will empower me to be improving at what I do: teach children. However, I have not always felt that way.

In our school we have advanced to a state of the art, technically advanced district. On the steps to get to this point, we, like all other schools, started with nothing and moved our way up. One of the first steps was to get a computer in every classroom for teachers to use. Upon receiving my first computer, I spent countless hours blindly exploring its capabilities. I soon attended my first technology class to learn more about this phenomenon. The instructor at that first class was very confident in preparing her equipment. She started her first presentation, but she soon had a malfunction in her equipment. She quickly realized her problem, made a few adjustments, her problems were solved, and she continued her presentation.

Her quick response to solve the problem was a defining moment for me. She understood her equipment and she could use her tools to convey her knowledge. I thought to my self, "This is the difference between her and me. This is what is holding me back. I want to be like her." We do not use technology to learn how to use computers; we are to use technology to help our students learn. Since that defining moment I have attended technology courses for three years, including one summer for distance learning, to learn how to use the tools that will make me an effective teacher.

This action research, If You Schedule It, They Will Come, has the teacher/researcher being a facilitator for other teachers. My research targets the infrequent use of distance learning lab in my school. My colleagues are excellent teachers who, like me, are willing to try new innovations in education. Why not the distance learning lab? This tool can bring the world to your classroom; Why not use it?

Purpose of the Study

The purpose of this study addresses a potentially similar situation that this researcher had experienced as stated earlier in this text. If one could facilitate a positive distance-learning experience for teachers and show them what they could do, would they use the distance-learning lab? What are the reasons teachers were not using the distance-learning lab? Was it simply the fact that they did not know how to use it? Teaching at a distance seems like such a mysterious process that it could possibly be intimidating. Maybe the teachers in the school district who were not using the distance learning equipment needed that 'defining moment' to see the distance learning equipment work. They needed to be shown them that it is a relatively easy learning process that yields great results. This researcher conveyed to them that he would do everything that was needed to get them to experience how the distance learning equipment worked without having to worry about any problems.

Ultimately, the study will determine if teachers and students will want to get back into the lab. Teachers may find the experience non-threatening. Students might be excited with this new experience in education. Teachers will then have a story to tell about distance learning. They can then make a decision on its effectiveness. Most importantly, teachers will then have a partner in cyberspace, something they never had before. The data will hopefully steer the distance learning paradigms that are currently engrained in teachers. We will find out that teachers will realize that distance learning is not only for other teachers. It is an option that is available to them and they may use it creatively.

The presence of distance learning is growing rapidly. Every level of education and business is using some form of distance learning. It is everywhere. Educators hold a responsibility to show our students innovation in learning. Then Vice-President Al Gore talked about being prosperous in today's changing economy, "All Americans deserve access to educational opportunities that will help them get ahead. We must make it possible for adults to learn at a time, pace, and location that works around the constraints of their daily lives. At a time when what you earn depends on what you learn, we need to promote innovative ways of educating Americans so that they can compete for the high-wage, high-skill jobs that our economy is creating in record numbers." (USDE, 2002) Students who see education being taught creatively will learn that technology in education can be enjoyable. This can enhance performance in the middle school and carryover to further education.

There are some strong indicators that the future of post-secondary education will include some form of distance learning. Our students will be using distance learning throughout their education. History has shown that it is an enjoyable way to learn. The National Center for Educational Statistics notes an increase in distance learning classes at 4-year colleges and universities; Enrollment tripled in the time period between 1995 and 1998. Also, NCER found that the participants in these distance-learning classes reported that 22.7% of the participants in distance learning classes were more satisfied with distance learning than the regular classroom. Also, 47.3% indicated that they liked both the distance learning courses and the regular classes. (NCES, 2000)

The traditional classroom support may argue that there is nothing wrong with staying in the regular classroom. Interestingly, distance learning also has some research backing its effectiveness. Research has proven that distance learning is as effective as the regular classroom. Many educators ask if distant students learn as much as students receiving traditional face-to-face instruction. Research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction, when the method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to- student feedback (Moore & Thompson, 1990; Verduin & Clark, 1991).

In the Results and Interpretation of the Data this researcher will reveal the reactions of distance learning teachers and students at the middle school where this research was conducted. These reactions will be weighed against the difficulty of change in education that will be addressed in the conclusion.

Review of the Literature

Keeping current with the trends in technology is difficult to do. In the world of education the factors multiply with so many options being available every year. School districts cannot afford to buy the latest equipment every year. Within a context of rapid technological change and shifting market conditions, the American education system is challenged with providing increased educational opportunities without increased budgets. (What is Distance Learning?, 2002) However, teachers have a responsibility to keep current and use what is available to them. Guillermo E. Pedroni of the University of Illinois at Edwardsville states, "Some schools help teachers to keep themselves trained on the latest equipment and software. Teachers must constantly adapt their curriculum to the changing needs of their students that computer technology can bring about." (IFT Insight, 1996)

The distance-learning lab which the participants are using and the system that is have set up in our state is a prime example of teacher's responsibility to keep current with technology to help students. Each teacher has daily access to distance learning. The technology is in the school but it is not being used to its potential. Jamie McKenzie (Jan. 2001), writing in Electronic School, proposes that we need to focus education for teachers on how to use the technology effectively. "After two decades of providing software classes to teachers, we need to explore different approaches — those honoring key principles of adult learning while placing both curriculum and literacy ahead of software and technology. This challenge should be about using new tools to help students master the key concepts and skills embedded in the science, social studies, art and other curriculum standards. It is not so much about powerpointing, spreadsheeting or word processing. (or in this case distance learning) The focus should be on teaching and learning strategies that make a difference in daily practice — on activities translating into stronger student performance. As a result of these practices and the use of these new tools, students should be able to . . .read, reason, and write more powerfully communicate productively with members of a global community...."

This research will address the teacher's willingness to keep current with technology if given the opportunity. If shown the correct method to use it, will the technology be used by the teacher to enhance student learning?

Design of the Study

Fifteen classroom teachers were assembled to see if they were interested in participating in a distance learning setting with their classes. All of them were presented with a proposal (Figure 1) to see if they were interested. Each was given a copy of the letter that would be sent to the other schools who decided they wanted to participate in the project. (Figure 2)

This research project, If You Schedule It, They Will Come, has been created to form a microcosm of South Dakota teachers. Every school in South Dakota has a distance-learning lab. Like the entire state of South Dakota, the teachers in my research have been given an opportunity to use the distance learning tools that are available in our

schools. It has been used for many classes and conferences, but not in this capacity with the teachers that were assembled for this research. With their consent to participate in this project, each of the teachers in this research group was offered assistance to conduct a class with another classroom in our state. They were offered several lesson plans if they choose to use them; They were guaranteed that this researcher would have total responsibility in running the audio and visual equipment, finding a second party to communicate with the distance learning equipment, reserving the lab, and being in total control of the distance learning experience. The teachers are required only to prepare the students with an easy lesson (Figure 1) that was offered to them and then go to the lab on a date that conveniently fit their schedule. The question behind the research is two-fold: 1) Will the teachers go to the lab in a non-threatening environment? 2) Will the teachers continue to use the lab if they have experienced distance learning?

The lesson plans that were offered suggest a sharing session with another school. In the sharing session the students are required to present 'information' for one minute each. The basis supporting this type of a lesson plan takes the 'pressure' off the teacher and places it on the student. The students 'pressure' is minimal as they only are responsible for one minute of information. It is a lesson that is very flexible. Each classroom setting can feed off this idea for their distance learning experience. This researcher, who has previous experience in conducting classes in the field of distance learning, anticipates that the students and teachers will experience the positive effects of distance learning. An educational experience is inevitable.

Of the educators that were given the proposal, 10 initially agreed to participate. Five teachers who initially agreed to participate had to decline because of scheduling problems. All of the reasons not to participate fall into the categories that all busy teachers have on their agendas. However, scheduling problems were the main drawback for most of the teachers who declined. Busy days in the classroom filled with prior lesson plans accounted for other difficulties in adding a distance learning experience. All of the teachers were very kind in declining the distance learning experience and some were even apologetic that they could not coordinate their current schedule with this 'new' idea which was being used in the school district. However, five of the teachers completed these classes in the project:

Middle school art teacher – shared and explained art work
Middle school physical education teacher – healthy foods
6th grade teacher – science day projects
6th grade teacher – zoo trip report
Middle school social studies teacher – Civil War presentation

These 5 teachers hosted a class with a class from another school in the state. The students did all of the presenting in 4 of the classes and there was a guest speaker in one of the classes, the Civil War presentation.

It turned out to be a win/win situation as each of the classes was a positive experience. Some of the classes had students that were more 'made for the camera' than others. Each of the classes consisted of a different subject matter, making comparisons difficult. This research looked for general similarities and differences in each class to draw conclusions.

Each of the teachers enjoyed the fact that the researcher was in charge of the organization of the class. They asked several times, "Is there anything I can do". The

researcher corresponded with the teachers from other towns through e-mail and telephone. For the final step in scheduling each of the classes, the researcher called the network, which was the technological link to set up each of the classes, and confirmed that the connection was scheduled on a date that was convenient for both classes.

Ironically, in trying to convey to the teachers the ease at which distance learning can occur, this researcher found it difficult to coordinate two different schools schedules to converge into one class period for one day. The most difficult portion of the project from a facilitator's point of view was in scheduling. Each school district has such a different schedule, there had to be a considerable amount of correspondence for each connection to be made. Fortunately, all of the people involved in this process were cooperative. Many times we would have to reschedule because of conflicts.

When the class was completed, the teachers were brought to the distance-learning lab. They were shown how to use the distance learning equipment. This portion of the project was necessary because the research ultimately tested if the teachers will independently pursue another distance learning experience in the future. The results of this question will be answered in the Results and Interpretation of the Data of this report. It was a 15-minute training session that showed all of the information needed to set-up, organize, and conduct an effective distance learning class. The researcher even had a few extra teachers who had heard about the excitement of the distance-learning classes that had been conducted and wanted to learn how to conduct a class, even though they were not part of this research project.

Data Collection

After the distance learning class had been held, each of the teachers was interviewed about the class and documented their reactions of the class that had taken place. It was a new experience for all of them, so it was quite interesting to hear their reactions. Upon completion of the distance learning session, each was given an electronic questionnaire, too, which was sent to their school e-mail. The questionnaire was done electronically so it would be as convenient as possible for them. It worked well as each of them were eager to tell about the class that they had completed. Each of the teachers who completed the project were asked to respond to these questions:

I enjoyed the class on the DDN.
Having a class on the DDN is something I would like to do again.
I can reserve a connection on the DDN.
I can set up the VTEL system in the distance-learning lab.
I know how to use the two main cameras on the VTEL and use the document camera.
I know how to 'dial in' to the other school.
What aspects of the DDN experience did you enjoy?
What aspects of the DDN experience did you not enjoy?
Why had you never held a class on the DDN before?
Which do you feel will be more difficult to do?
    Prepare the content for the class
    Find a class to connect to
Could you teach someone how to set up and host a class on the DDN?

Are you going to have any distance learning classes next year? If so, how many?

Interviews

Invariably, the teachers that participated in the project reacted positively. It was an experience that benefited both the teacher and the student. The enthusiasm of these teachers is a credit to their profession and this researcher was encouraged by their willingness to try something new.

Some teacher responses:

"I can't believe that this equipment was that easy to use, and I have never used it."
"The kids were so excited!"
"I couldn't believe the excitement before the class."
"My students really worked hard to prepare this lesson. They really wanted to do a good job."
"They have talked about the class for days afterward."
"Many of my students have asked me several times if they get to do the distance learning class again."

Some student responses:

"That was cool!"
"They ask a lot of questions!"
"Can we do that again?"
"We need to do longer next time."
"Thank you, Mr. Hoglund."
"You need to teach my other teachers how to do that."

The results can be seen in their entirety in the appendices. (Figure 3)

Interpretation of the Results

The participants in the research and their students enjoyed the distance-learning class that was conducted. This coupled with the fact that they all are going to continue use of the distance learning setting is a significant finding from the results. The teachers reacted positively to student responses that were given as a result of the class: "That was cool", "Can we do that again?", "We need to do that longer next time", and "Thank you". These student reactions had an impact on the teachers. The class created such a positive response from the students that the teachers invariably agreed that they would recreate a distance learning setting. Another interesting statistic from the date shows that all of the teachers plan on conducting more than one distance learning class in the future. This shows a degree of commitment on the part of the teachers to stay with this method of teaching.

The participants reacted favorably to the idea of doing something different. Here are some responses to the question, "What did you like about the class?": "*I liked* it when you could communicate with different students and teachers about different technology they will use in their classrooms", "*I liked* hooking up with a class from a distance away", "*I liked* the instant feedback (reaction) of the students from the other

school", "*I liked* the idea of talking and sharing with another class in the state and the excitement of the students", "I enjoyed having the experience", and "*I liked* it when they talked about it for days!". This researcher observed a considerable amount of enthusiasm from each of the teachers. They enjoyed what they were doing and they were proud of their student's performance. This is noteworthy simply because this was a different kind of pride in a different setting. Most of the comments from the teachers on this question stated that doing something different is meaningful and positive.

Asked if they were able and willing to work totally independently with the distance learning equipment, the participants were not all willing to have total control. This is understandable. The teacher's role in a distance learning setting is not magically successful. Some inhibiting factors of the process will keep some teachers out of the lab until they feel more comfortable with this teaching method. A report from the University of Idaho indicates the success of any distance-education class rests squarely on the shoulders of the faculty. In a traditional classroom setting, the instructor's responsibility includes assembling course content and developing an understanding of student needs. Special challenges confront those teaching at a distance. For example, the instructor must:

- Develop an understanding of the characteristics and needs of distant students with little first-hand experience and limited, if any, face-to-face contact.
- Adapt teaching styles taking into consideration the needs and expectations of multiple, often diverse, audiences.
- Develop a working understanding of delivery technology, while remaining focused on their teaching role.
- Function effectively as a skilled facilitator as well as content provider. (Key Players in Distance Education 2002.)

The five teachers who used the distance-learning lab for a classroom were previously not using it because they simply did not know how. They simply did not realize that this was one of their options. Likewise, they were amazed at how easy it was to set up and operate the equipment. With practice each of them will be able to more confident with the equipment. The fact that all of the teachers have decided to conduct more than one distance learning class next year is encouraging, considering that none have ever done it before.

Notably, two of the participants in this research stated that they would not feel comfortable teaching someone else how to use the distance learning equipment. They did not feel so confident with the equipment that they could teach a colleague how to use it. Unfamiliarity with the system was what kept them from teaching at a distance in the first place. I feel after a few more classes via distance they will feel more comfortable. However, after the initial experience in the distance-learning lab, three of the participants felt that they had enough confidence in the process to teach someone else how to do it. With this consistent wave of positive feedback from the participants and some honest apprehension, the research shows that the teachers will return to the distance-learning lab. This researcher feels considerable progress has been made toward more frequent use of the distance learning lab because of the significant impact of their first experience with the process.

Conclusion

The results of the research indicate the possibility of a positive learning experience using distance learning is highly probable. The data shows that teachers will use the technology for distance-learning if they see its effectiveness and are instructed how to use it. However, the journey to get to the distance-learning lab goes through scheduling conflicts and the difficulty of change in education, which is no small task. To focus on technologies without considering their role as a catalyst for change can adversely affect the ability of technologies to enact change (Heinich, 1982). Heinich suggests that we tend to treat all technological innovations almost the same, yet technologies such as television can affect the power structure in education, and faculty prefer the power structure the way it is. Teachers walked by that distance-learning lab many days without thinking twice about using it. The main reason for not using the lab was the lack of instruction on how to use it properly. Great things happened when we were using it, though. They will now look at distance learning opportunities as one of their options. Many teachers feel the opportunities offered by distance education outweigh the obstacles. In fact, instructors often comment that the focused preparation required by distance teaching improves their overall teaching and empathy for their students. In developing or adapting distance instruction, the core content remains basically unchanged, although its presentation requires new strategies and additional preparation time. To function effectively, students must quickly become comfortable with the nature of teaching and learning at a distance. Efforts should be made to adapt the delivery system to best motivate and meet the needs of the students, in terms of both content and preferred learning styles. (Why Teach at a Distance?, 2002) Statistics have shown that our students will experience forms of distance learning throughout their education. Teachers have an obligation to expose them to nontraditional methods of teaching.

McKenzie's (2001) proposal suggested focus on education for teachers to make students able to communicate productively with members of a global community. The communication that took place in those classrooms was beyond productive. It was technology, as we know it in this small town, at its finest. It was technology working effortlessly to facilitate learning. The excitement was everywhere and kids eagerly asked for more. The journey to get there is now a little easier for the teachers who where shown how to conduct a distance learning class, and they now have partners in cyberspace.

Appendix

Figure 1. Proposal to teachers

Using the Distance Learning Lab
If You Schedule It, They Will Come!

This innovative experiment will allow you to expand your teaching horizons. It will be done on a voluntary basis and you will not be evaluated. My study is done with two objectives in mind: 1) I want you to use the distance learning lab. 2) I want to see if you will continue to use the distance-learning lab if you are guided completely one time. The educational benefits will be great for your students and there is very little work to prepare. Everything will be done for you.

I would like to connect your class with another class in the state of South Dakota. I will contact the teacher and the technology director of that school to make the connection possible. This connection will be a 30-minute class of student participation, approximately 1 minute reserved for each student. Each student will present some *information* to the "visiting class". All you have to do is have the students prepare their one-minute of *information*. The *information* to be presented is discussed later in this document. It is designed to be a non-threatening experience for the students as well as the teachers. I will fully facilitate the first, and possibly only, connection between the two classes as you present your *information* to them. If you decide to continue the connection with the cooperating teacher and have them present to you, I will supply you with all the procedures you need to do this independently. All of the initial classes will take place in the time frame of 12:25 to 1:13, which is 6th period. So you will make your initial presentation at this time, but any continuing connections will be at any time you wish.

Types of Information Presented by the Students

I will use the number **20** as the number of students in the class. This will vary.

1. 20 Topics we studied this year. (Each student will present one topic.)
2. 20 Important Reasons to be Patriotic
3. 20 Health terms that you should know (Social Studies, Tech Ed, Math, Science, Music)
4. The most important person in my life (20 different people, obviously)
5. What I would like to do to show patriotism
6. What I would like for a career choice
7. My poems, talent, artwork, photographs, etc. (We can use the document camera.)
8. Many other possibilities.... (guest speakers, presentations from businesses, etc…)

The students will have approximately one minute to present their information. It will be a great experience for the kids, a minimal amount of work for the teacher, and a new experience for everyone. The students will learn the importance of speech and preparedness, even if it is only for a minute. The kids will also learn about distance learning and its possibilities. It is a win-win situation.

I have chosen this format because it is nearly impossible for one class to be studying the same information as another school at the same time. I have also chosen this format because it will be something new and fun. The kids will enjoy a chance to see and talk to other kids their age in a classroom setting. This is my main objective.

The second objective that I stated earlier is optional for the teacher. After your kids have presented the information to the "visiting class", the teacher can decide to 1) host another class, or 2) issue a challenge to the other class. The challenge, if the teacher chooses, will invite the "visiting class" to present a similar 30-minute class for our kids in Dell Rapids to view. A similar format could be used or any other format they choose to use.

All you will be responsible for is: 1) designating a time for the next connection, 2) contacting the DDN to reserve the time, 3) and getting the kids in the lab to view their presentation.

As the facilitator of this experience I will contact the "visiting" teacher and offer any information they need to help connect them to you.

However, you can choose not to have a second connection if you wish.

This innovative experiment will be something that you may enjoy. The possible connections beyond the VTEL lab are numerous: Links of information on the teacher's website, pen pals, learning about their town or area, using the lab for other things once familiarized with it, sharing of projects on similar topics, etc. The teacher-to-teacher connection may be beneficial in keeping current with ideas and possibly teaching classes to them or receiving information from them in the future. The students will let you know if they like this different form of learning.

There may be a teacher that you know somewhere in South Dakota that you would like to try this experiment with. It might be someone you met at a summer class or an old classmate you haven't seen in awhile. The classes don't have to be the same

grade. You can use your own discretion on what would work best for your class. I want this to be as comfortable as possible for you. I will be as helpful as possible to make this work for you.

I encourage you to talk to your peers about this. It will really be a neat experience for your students. Remember, you don't have to do much for the initial connection, and you are done after that if you choose to be.

1. Mick, I'll try it and I have someone in mind to connect with.
2. Mick, I'd like to do it, but don't have anyone to connect with.
3. Mick, I would like to thank you for the opportunity, but I decline.

If you choose 1 or 2, please sign your name to the sign-up sheet and I will take care of everything. I am confident that you will enjoy this project. Your students will, too.

-Mick Hoglund

Figure 2. Letter to Other Schools

Participants in the Distant Learning Project:

The teachers in the Dell Rapids Middle School are eager to get on the big screen to talk to your kids for a 30-minute class. We will be doing all of the 'teaching' or 'presenting'. All you need to do is attend the class at the VTEL lab that is in your school. If you have a good experience with this "presentation", you can work out another time with that cooperating teacher, to meet again on the VTEL. Also, you may possibly have a connection with another classroom to share ideas or projects in the future. Our hope is that this small, but significant, project will make our state a little closer, our teaching a little more effective, and our students a little more knowledgeable.

The amount of work that you do is limited to going down to the VTEL lab and watching the kids from Dell Rapids. If you choose to reciprocate by having your own presentation, you may make arrangements with the cooperating teacher.

We truly appreciate your ability to try something new in the world of education. Thank you for your time in this busy school year.

Respectfully,

Mick Hoglund
Dell Rapids Middle School
Dell Rapids, SD 57022
hoglunmi@dellrapids.com

Figure 3. Results of the Electronic Questionnaire

Results and Interpretation of the Data

Five out of the five participants said they enjoyed the class on the DDN.
Five out of the five participants said that having a class on the DDN is something they would like to do again.
Five out of five participants said that they could reserve a connection on the DDN.
Four out of the five participants said they can independently set up the distance learning equipment.
Four out of the five said they know how to use the two main cameras and how to use the document camera.
All of the participants said they know how to connect to another school.

What aspects of the DDN experience did you enjoy?

I LIKED IT WHEN YOU COULD COMMUNICATE WITH DIFFERENT STUDENTS AND TEACHERS ABOUT DIFFERENT TECHNOLOGY THEY WILL USE IN THEIR CLASSROOMS –

HOOKING UP WITH A CLASS FROM A DISTANCE AWAY, OTHER THAN A DRMS CLASS –

THE STUDENTS WERE EXCITED ABOUT IT AND TALKED ABOUT IT FOR DAYS, THEY WANTED TO DO IT AGAIN. I LIKED THE INSTANT FEEDBACK (REACTION) OF THE STUDENTS FROM THE OTHER SCHOOL –

THE IDEA OF TALKING AND SHARING WITH ANOTHER CLASSROOM IN THE STATE AND THE EXCITEMENT OF THE STUDENTS –

IT WAS A REALLY WORTHWHILE EXPERIENCE FOR MY STUDENTS. THEY ENJOYED HAVING THE EXPERIENCE, AND I DID AS WELL. -

What aspects of the DDN experience did you not enjoy? *The only portion of the experience that one of the participants did not enjoy was one connection didn't respond immediately to the call on the day of the class. So, there was a delay.

I CAN'T THINK OF ANYTHING THAT DIDN'T GO WELL. IT WAS REALLY A NEAT EXPERIENCE –

*IT TOOK AWHILE TO HOOKUP WITH THE OTHER SCHOOL –

THERE WERE NONE –

NONE-

IT HAS A LOT OF HOOKUPS, BUT WITH FUTURE INSTRUCTION I COULD LEARN TO DO IT MYSELF

Why had you never held a class on the DDN before?

I WASN'T FAMILIAR WITH THE SYSTEM UNTIL MR. HOGLUND ENCOURAGED US TO GIVE IT A TRY. –

THE OLD ADDAGE: I DIDN'T THINK I HAD TIME AND UNCERTAINTY OF THE WHOLE CONCEPT –

DID NOT HAVE THE KNOW HOW –

I WAS UNSURE ABOUT HOW TO WORK THE PROCESS –

DIDN'T KNOW MUCH ABOUT IT, PLUS IT IS KIND OF NEW TO OUR SCHOOL. PLUS MANY OF US PROBABLY HAD OTHER THINGS TO DO FOR OUR CLASSES, BUT THE MORE WE USE IT THE BETTER OUT STUDENTS WILL BENEFIT FROM THE TECHNOLOGY

Three of the participants in the project thought that it would be more difficult to find a class to connect with in a distance learning setting than to prepare the content for a distance learning class.

Three of the participants said they felt comfortable teaching someone else how to set-up and a host a distance learning class.

All five of the participants said they would host distance-learning classes. Each of them said they plan to host distance learning classes more than once next year.

MAYBE 2 OR 3 –

ONE PER SEMESTER –

I PLAN TO DO IT ABOUT EVERY QUARTER AS A CRITIQUE FOR THE STUDENTS ART WORK –

ONE PER SEMESTER –

I'D LIKE TO SET UP A FEW (THREE OR FOUR) CLASSES NEXT YEAR

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Elementary Students Responsiveness and Video Conferencing

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Abstract

The purpose of this study was to investigate the responsiveness of elementary age students to the use of video conferencing techniques. The action research design assessed student reactions via classroom observations, participant surveys, and structured interviews. Study participants included two fourth grade classrooms, five teachers, two administrators, one college student and one college professor.

The first aspect of inquiry was the age of the distance learners. Are fourth graders developmentally able to benefit from distance education? The second point of inquiry involved the motivation and engagement factor of teaching via a distance. Would video conferencing provide ample interaction to engage elementary students during instruction?

Introduction

Fitzpatrick (2001) suggests that public as well as political interest in distance education is high in geographical regions where the student population is widely distributed. Furthermore, he found that public policy leaders, in some states, recommend the use of distance education as opposed to traditional learning. The rural and remote nature of South Dakota seems to reflect such perspective. The state purchased distance education equipment to be placed in all high schools and middle schools across South Dakota, and offered teacher training to become skilled in the use and implementation of the equipment. As a result, many elementary and secondary teachers completed training offered by the state in the use of videoconferencing equipment (V-tel systems) and the Digital Dakota Network(DDN). Although educational research in the distance education arena has concentrated on its use with college students and professors (Mottet, 1998a), the purpose of this research study was to investigate the responsiveness of elementary students to distance education and the use of videoconferencing instruction.

Review of Related Literature

In the past decade, Verduin and Clark (1991) viewed distance education as the "separation of teacher and learner for at least a majority of the instructional process... with the use of educational media to unite the teacher and learner to carry course content

or the provision of two-way communication between an educational agency and learner" (p. 5). It seems that good distance teaching practices are basically identical to good traditional teaching practices and "those factors which influence good instruction may be generally universal across different environments and populations" (Wilkes & Burnham, 1991, p.44). However, Kelly (1990) indicated that the transition from regular instruction in the traditional classroom to distance education requires teachers to develop new skills in instructional strategies, methods of teaching, timing, interactions, feedback, materials and evaluation. According to Wilkes and Burnham, practicing good traditional teaching is what teachers do everyday; and therefore the transition to distance teaching practices should be easy! Interestingly enough, Souder (1993) found that the instructional format itself has little effect on student achievement as long as delivery is appropriate to the content.

Furthermore, Souder (1993) suggested that teaching is a relational activity, and that the teaching and learning situation can be enhanced by an ongoing interpersonal relationship between the teacher and the student. Consequently, a major concern for both teachers and students involved in distance education is the level of teacher-to-student interactions, including the verbal and nonverbal cues, during the actual distance education class times. Likewise, Swan and Jackman (1996) found that strategies for teaching at a distance are merging with traditional teaching because the traditional teaching strategies are abandoned and modified in favor of a problem-based or activity-based approach that de-emphasizes the teacher as the main source of knowledge.

Brooks and Woolfolk (1997) conducted research relative to primary and secondary education that suggested teachers in the traditional face-to-face classroom form impressions of their students based on the students' nonverbal responsiveness. This research included such nonverbal behaviors as: where the student sits on the first day of class (assuming student choice), student posture, eye contact, and smiling. As a result, they compared the nonverbal cues in a face-to-face classroom and the nonverbal cues in a distance-learning classroom. Their findings showed a significant decrease in the ability of the distance educator to perceive the nonverbal responses of their students. This study also found that teachers negatively altered their impressions of students due to lack of attentiveness cues from students at the remote site. As a result, Brooks and Woolfolk concluded that even though many institutions promote interactive technologies as able to simulate the face-to-face classroom experience, the data suggested otherwise in terms of capturing and transmitting nonverbal cues that have been shown to be an important source of information to teachers.

So, how does such educational research impact the use of distance education in elementary and secondary schools? Specifically, how will children respond to the use of such distance education techniques as video conferencing?

Action Research Approach

The purpose of this action research study was to investigate the responsiveness of elementary age students to the use of video conferencing techniques using qualitative research methods. Mills (2000) suggested that a qualitative or descriptive way of examining a problem is reflected in most action research literature. According to Guba (1981), the trustworthiness of a qualitative study relies on addressing credibility,

transferability, dependability and confirmability. Consequently, to establish validity, this study involved the following:

By conducting the distance education class for nine sessions over three months time provided a prolonged experience for study. Likewise, multiple data sources were triangulated to analyze for patterns and common themes to emerge.

By collecting detailed, descriptive data, the researchers create portraiture for readers of the study to view.

By gathering multiple sources of data and inviting others (colleagues, principal) to analyze the data, dependability of the results was addressed.

By having various participant observers, the gathered data was confirmed and a certain level of objectivity was maintained.

Definitions

Host site: The school where the instructing teacher was located and where the course originated during the collaborating sessions. The teacher was physically in the room with the students. The host site for this study was East Elementary School in Spearfish, South Dakota.

Remote site: The classroom where the students were physically in a school setting, but the instructing teacher was not in the classroom. The remote site for this study was Wolf Creek Elementary School in Pine Ridge, South Dakota.

The V-tel system is the brand name of the video conferencing equipment used to connect to the Digital Dakota Network (DDN). Sessions or bridges refer to the time when the host and remote site were in conference. All students participating in the process were considered distance learners.

Participants

The remote site for this study was identified from a listing of South Dakota schools having the availability of distance education equipment within their building. Wolf Creek Elementary houses kindergarten through eighth grades, therefore they are a middle school and received the equipment and infrastructure for utilizing the Digital Dakota Network for distance education. Upon request, the host site volunteered to participate in the study. The distance education equipment for the host site was located at a middle school, which is across town from their elementary classroom. Parent drivers were recruited to transport students to and from the video conferencing sessions while the remote site had access to the conferencing equipment within their school building.

The host and remote sites are approximately 160 miles apart. All student participants were enrolled in the fourth grade. The host site had twenty-five students participating in the collaborative classes while the remote site had seventeen students.

The ethnicity of the host site fourth grade class was predominantly Caucasian and the ethnicity of the remote site fourth grade class was predominantly Native American. However, culture was not considered a factor in this study.

All students at both sites participated in the study, regardless of academic ability or special needs. Informed consent was obtained from parents and guardians of the students for participation after the research study was fully explained prior to its implementation.

Instructors for both fourth grade classes had a minimum of at least fifteen years of experience in the traditional face-to-face instructional classroom. Yet, neither had used video conferencing before or were trained in the use of equipment necessary to facilitate the sessions. A lab instructor or techno logy coordinator was involved at both sites to prepare the class sessions for video conferencing and to ensure the distance education equipment was working properly. The technology specialists also participated in the instruction of lessons as well as recording classroom observations, and maintaining a descriptive journal to record their impressions and insights as the study progressed.

Collaborative Lessons

Students introduced themselves during the first session. Student creativity and spontaneity surfaced early in the distance education project. They interviewed each other and introduced their classmates from their interview notes. Topics for further study were generated by questions asked by students at both sites. Some of the information students wanted to know about the other school and community were:

What does your classroom look like?
What do you do for science?
What do you have on your playground?
Do you have PE?
Do you have a Taco John's in your town?

The format for the collaborative distance class was informal to encourage students research and present information about their respective schools and communities in response to questions asked by each fourth grade class. Threlkeld and Brzoska (1994) reported that distance learners require support and guidance to make the most of their distance learning experience. During this study, student participants at both sites received support from classroom teachers, administrators, parents, media and college student participants. Adult participants were grouped with students to accomplish the lessons and to help students become familiar with the distance education format.

This action research project was guided by the following overarching question: How do elementary students respond to distance education and the use of videoconferencing instruction? Specifically, students were asked:

What did you like about the videoconference sessions?
What did you not like about the videoconference sessions?
What did you learn about the other students and their school and community?

Data Collection

According to Sagor (1992), a researcher should not rely on any one, single source of data, interview, observation or instrument. Therefore, this study used three different methods to collect data: observations in the video conferencing classroom, student interviews and a participant survey. Observations in the video conferencing classroom focused on student discussion, student interaction, and student body language. (See Figure 1)

Student participants were interviewed randomly throughout the study. Such questions included,

What are you learning?
What things are difficult or frustrating?

What did you like best about going to the V-tel classroom?
What new thing did you learn today?
What would you like to change about the telecommunications?
Would you like to do a telecommunications project like this again? (See Figure 2)

An online survey was administered to all participants and observers in the study addressing their attitudes toward using distance education as a teaching/learning strategy. (See Figure 3)

Data Interpretation

The approaches used for data interpretation were concept mapping and key questioning. These techniques according to Stringer (1996) enable the researchers to extend their understanding of the problems, contexts and situations. Such concept maps help researchers visualize major concepts and themes that have emerge from the study.

Administrators' Observations

Administrative observations concerning the process of using video conferencing with elementary students included the following:

- Students were engaged, attentive, motivated and on task when they presented to their peers using real time video. It was an engaging medium.
- Traditional instructional approaches such as the use of KWL charts worked well in preparing students for the real-time experience.
- Students and teachers appreciated the need to be prepared for the on-line time. They realized that you just can't 'wing it'; instructors needed to have an agenda. The online time was a good culmination and presentation experience for students.
- Students needed to understand the rules for speaking online. The formality that the technology limitations put on the interactions was positive, as it taught children the importance of taking turns and listening carefully.
- Students were able to learn about one another's lives and communities. Students learned that we are not all that different from our neighbors and that we share many common interests.
- Video conferencing as an instructional strategy at the elementary level is a very appropriate tool that teachers can use. The technology is still not as transparent as it needs to be, but these early efforts are indicating to me that this is a methodology that needs to be expanded.

Conclusion

The question guiding this study was, how do elementary age students respond to the use of video conferencing techniques? The data from the study suggests a favorable learning experience for the elementary students. Specifically....

- Students learned to ask relevant questions.
- Students gained presentation skills necessary to provide relevant and pertinent information in response to specific student questions.

- ✔ Students developed an appreciation for differences in teaching philosophies and instruction.
- ✔ Students discussed their distance education experience with non-participating classmates.
- ✔ Students acquired knowledge in the use of distance education equipment and techniques.
- ✔ Students gained understanding of other students and teachers.
- ✔ Students applied knowledge from this experience to new situations.

Students never complained about the disruption in their regular school day to participate in the video conferencing sessions. They were always excited and ready to present! In addition, their knowledge of their school and community was outstanding as they fielded questions from students at either site.

As the educational literature presented, a major concern in distance education is the level of student engagement during the video conferencing sessions. The instructing teacher was responsible for maintaining interaction and engagement at both sites during instruction. That was not a problem with these fourth grade students. They brought their own level of interaction and engagement!

Student behaviors were similar to student behavior in the regular classroom. The disruptive students were still disruptive, but observers noted they were less disruptive in the new learning environment. The relationship between the instructor and the students in this study was very similar to the regular classroom relationship. Students were called on by name at both the host and remote site by the teacher, and they raised their hands (most of the time) to ask questions and gain permission from the teachers. Furthermore, students at both sites wanted to continue the conferencing sessions and eagerly came up with new ideas to explore about the other site! However, host site teacher participants were not as eager to continue because of the transportation issue for the students.

Implications of the Study

Given the findings of this study, future applications of distance education with elementary students appear to have a promising future. The collaborative project was a rewarding experience for all participants: the students, the parents and the teachers. The teachers involved acquired a wealth of experience in using video conferencing, and are excited to try another collaborative project. As elementary teachers experiment with using distance education with their students and gain more confidence with the new delivery method, distance education should be considered a viable method of instruction for younger students.

Presently the availability and accessibility of distance education equipment for elementary classrooms in South Dakota limits the use of the Digital Dakota Network. Because the distance equipment was placed in middle schools and high schools, younger students generally have to travel to participate in such distance education opportunities.

The three administrators who participated and observed in one or more of the sessions expressed favorable comments regarding the use of video conferencing for elementary students to collaborate. They found the experience to be more than *fun and games*; it was educational!

Recommendations

As a result of this action research project, the following recommendations are offered:

1. Teacher pre-service and in-service programs need to include training in distance education technologies.
2. Research studies need to be conducted to identify the most appropriate instructional strategies for younger students. More research needs to be done to determine content selection to best promote higher learning for younger students.
3. Technology budgets for school districts need to include the purchase of distance education equipment for elementary schools.

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Figure 1: Observations from the video conferencing classroom, data from teacher observations and student interviews or student journaling.

What students liked about the video conferencing sessions-	What students did NOT like about the video conferencing sessions-
Meeting new kids	Being 'very' quiet in the V-tel classroom
The 'special' feeling associated with being in a project where not all are included	Not always being able to hear the students at the remote site
Traveling to the high school for the sessions	
Seeing yourself on the monitor screen	
Presenting the information to the remote site. It makes us feel important and smart.	
Taking turns with the students at the remote site	
Learning about another school	
Time 'out' of regular classroom	
Everyone had a chance to present information to the remote site	

Figure 2: This table represents observations made by students or information gathered from interviews with an adult participant.

Students perception of their learning Q. What did you learn about the other students, their school and their community?		
Spearfish has more people than Pine Ridge.	Our school days pretty much the same.	Both Spearfish and Pine Ridge have a Taco John's.
Both towns have interesting people in the communities.	Both schools use the gym for the lunchroom.	Wolf Creek students have the videoconference equipment right in their school.
Both classroom teachers make the students spell words correctly.	Spearfish students have a computer lab to go to and they go to the lab two times a week.	Spearfish has a special hands-on way to learn science.
It is fun to spelling games against one another during the V-tel sessions!	Spearfish and Pine Ridge are about 160 miles away from one another.	Spearfish is in the northern part of the state, in the Black Hills and Pine Ridge is in the southern part of South Dakota.

Figure 3: On-Line Survey Results

1. Type of Participants Responding		
• Adult	6	
• Student	39	
	Yes	No
2. Did you enjoy going to the V-tel room for the bridges?	93%	7%
3. Would you rather have stayed in your classroom to do your regular work?	16%	84%
4. Would you like to do a project like this again?	91%	9%
5. Did you tell your family and friends about the project?	84%	16%
6. Did you learn something new about the other school?	100 %	0%
7. Did you learn something new about the other community?	100 %	0%
8. Did you learn something new about the other students?	100 %	0%
9. Was the project TOO much extra work?	4%	96%
10. Did you enjoy using the technology this way?	98%	2%
11. Did you involve parents or other people in the project?	80%	20%
1. The part I liked best was (sample answering): ✔ Meeting other kids ✔ Being excited ✔ Using PowerPoint presentations to show our school ✔ Asking the other students questions ✔ Answering the questions from the students ✔ Seeing myself on the screen ✔ Interviewing our principal ✔ Playing spelling games		
12. Other comments (sample answering): ✔ I want to visit more. ✔ I would like to bring my Gramma to talk on the DDN. ✔ Can we do this again? ✔ I would like to visit Wolf Creek School. ✔ I would like to visit Spearfish someday. ✔ I think I learned.		

Student Achievement, Satisfaction, and Instructional Delivery Modes

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Abstract

Despite the proliferation of online learning in higher education, little scientific, qualitative research has been conducted to examine online learning on student achievement and satisfaction levels. This is especially noted in the areas of health and physical education. The primary purpose of this study was to investigate the effects of three different modes of instructional delivery (online instruction, traditional face-to-face instruction, and combination of online and traditional instruction) on student achievement and satisfaction levels used in an undergraduate wellness course at a mid-sized rural university. Differences in student rating of the course and instructor, quality of learning, quality of communication, and support were also examined.

With an Advanced Technology grant from the Governor of South Dakota in 2001, an interactive online wellness course was developed through a collaborative effort of a faculty member, an instructional designer, and a technical specialist at Northern State University. A survey was developed to examine student demographics, student perceptions of online learning, and student satisfaction levels. One hundred fifty-three undergraduate students (71 men, 82 women; between the ages of 18 and 55 years, M=22.5 years, SD=7.0) completed a survey for this study. Comparing mean scores of a standard pre-and post course knowledge test among three groups was used to determine the effectiveness of the online course. A one-way analysis of variance (ANOVA) and Post hoc Scheffe multiple comparisons were conducted to compare the effects of the three different methods of instructional delivery on student achievement and satisfaction levels.

The results of this study indicated that students in the online learning group and the combined online and traditional learning group had a statistically significant higher achievement than students in the traditional learning group ($p<.05$). Students in the online learning group had statistically significant greater satisfaction levels with their overall learning experience than students in the traditional learning group ($p<.05$). These findings suggest that a well-designed online course can be very effective in teaching wellness. Also, online learning may motivate students to become more active learners, making them responsible for more of the learning process because it accommodates different learning styles and is convenient for students.

Introduction

Over the past decade, advances in the Internet and World Wide Web (WWW) technologies have significantly facilitated student learning and teaching in colleges and universities throughout the world. With a large percentage of university populations

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working part-time or full-time, and having computer and Internet experience prior to entering college, online education can provide increased opportunities to better meet their needs, interests, learning styles and work schedules. Technology skills have become an important key to success in the modern workplace. Therefore, online education can provide students with an array of sources and increased opportunities to improve knowledge and skills in technology applications that are vital to the modern workplace. (Gubbins, Clay, & Perkins, 1999; Johnson, Roach, & Homes, 1999).

Numerous studies regarding the integration of online education have indicated the following benefits: a) an enhancement in communication and collaboration, b) an increase in accessibility, c) greater access to Internet resources, d) enhanced technical skills, and e) the promotion of a student-centered environment (Cooper, 1999; Gubbins, 1999; Johnson, 1999; Rosenkrans, 2001; Schrum & Lamb, 1996). Because of its benefits, online learning has been becoming increasingly popular for instruction in both distance education and the traditional class to enhance teaching and learning. Some studies found that integrating online components into traditional classes substantially improved communications, increased assess to Internet resources and provided a high level of student satisfaction. (Kaynama & Kesling, 2000; Schrum & Lamb, 1996). In keeping with this trend, many instructors in higher education utilize Internet and WWW technologies in their classes to enhance teaching and student learning. At the same time, there has been a rapid growth of online courses.

Studies indicate student learning via online courses is equivalent to traditional classes (Aljadaani, 2000; Kalsow, 1999; Schulman and Sims, 1999; Wright, 1999). However, there has been more effort in developing and implementing online education than in investigating its effectiveness and student satisfaction with online education. Despite the proliferation of online learning in higher education, little scientific, qualitative research has been conducted to examine online learning on student achievement and satisfaction levels. This is especially noted in the areas of health and physical education. Gaining knowledge of student perceptions of online learning and its effectiveness is essential in order to improve online teaching and student learning. Therefore, the purpose of this research project was to investigate the effects of three different modes of instructional delivery (online instruction, traditional face-to-face instruction, and combination of online and traditional instruction) on student achievement and satisfaction levels used in the wellness course at a mid-sized rural university. Differences in student rating of the course and instructor, quality of learning, quality of communication, and support were also examined.

Methodology

Subjects

Students enrolled in the wellness course at Northern State University were asked to participate in the research during the spring of 2002. The course is required for all undergraduate students as part of their general education requirement and was taught by online instruction, traditional face-to-face instruction, and combination of online and traditional instruction. As the students registered into one of the three modes of instruction based on their preference, they were divided into three treatment groups: online learning group, traditional learning group, and combined online and traditional

learning group. The online learning group received only online education, with no face-to-face interaction between the instructor and students and among students. Students in the traditional learning group was taught on campus through a traditional face-to-face method. Students in the combined online and traditional learning group were taught on campus with combination of online instruction and traditional face-to-face instruction. However, all students in the three groups had the same instructor, requirements, learning objectives, and course materials such as exams, assignments and textbook.

Instrumentation

The University's Student Evaluation on Teaching Survey was modified and used to evaluate course contents, availability of the instructor, quality of learning experience, and grading process. In addition, as a part of the South Dakota's Star School Project organized by the South Dakota Alliance for Distance Education (SDADE), the researchers developed an Online Education Survey (OES). The OES instrument consisted of three parts, each of which provided specific information regarding the participants. The three parts were designed to identify (a) student demographics, (b) student perceptions of online learning, and (c) student satisfaction levels. Reliability was determined with a test-retest pilot study. To determine the test-retest reliability coefficient between two pilot surveys, a Pearson Product Moment Correlation was calculated. The test-retest reliability was $r = 0.93$. A Cronbach alpha coefficient value was also computed to determine the internal consistency of the two surveys. The Cronbach alpha coefficient value was 0.91. The reliability coefficients for this survey instrument were high.

Procedures

With an Advanced Technology grant from the Governor of South Dakota in 2001, an interactive online wellness course developed through a collaborative effort of a faculty member, an instructional designer, and a technical specialist at Northern State University during summer, 2001. Because of its excellence, the online course was nominated for the **Best Online Course Award** by the Electronic University Consortium of South Dakota in 2002. For each lesson, there were an interactive streaming online lecture, virtual lab, online quiz, online discussion and an extensive set of web links. It was designed to better meet needs, interests and learning styles for online students. For example, the immediate feedback from an online quiz enabled students to spend more time in areas where they needed to improve their understanding. An extensive set of Web links was also provided to help students explore research and locate information related to course content.

An online interactive, virtual tutorial program for the WebCT was provided for students in the online learning group when they enrolled. However, students in the combined online and traditional learning group were trained to use the WebCT and its features by the primary researcher and an instructional specialist during the first week of class. After training, the students in both groups were able to use the discussion board, e-mail, lessons, web links and other course materials. The first requirement of the semester was to post a personal introduction on the course discussion board; an exercise to acquaint them with class members and to become familiar with the WebCT features. All communication was stored and tracked for analysis after the research was concluded.

All three student groups completed a pre- and post-course knowledge test to measure skills and knowledge they were expected to master during the course. The same standard test was given to all students in each group. Comparing mean scores of pre- and post-tests among three student groups was used to determine the effectiveness of instructional modes. In order to provide exam integrity, students were proctored. In addition, the survey questionnaire was administered to each student at the end of the semester to provide the student with enough time to become familiar with the course. The researchers explained the nature of the survey to students and answered questions they had prior to administering the survey.

Data Collection and Analysis

Descriptive statistics (percentages, frequency distributions, means, ranges, and standard deviations) were utilized to analyze student demographic characteristics. A one-way analysis of variance (ANOVA) was conducted to compare the effects of the three different methods of instructional delivery on student achievement and satisfaction levels. When the results of the ANOVA test were statistically significant, Post hoc Scheffe multiple comparisons were conducted to determine where differences between means existed. Statistical significance was accepted at an alpha level of $p<.05$.

Results

Demographic Characteristics of Participants

In Table 1, a breakdown of respondents by gender is presented. One hundred fifty-three undergraduate students (71 men, 82 women; between the ages of 18 and 55 years, M=22.5 years, SD=7.0) completed the survey. Of the respondents, 31 (14 men, 17 women; M=30. 3 years, SD=10.6) were from the online learning group, 82 (42 men, 40 women; M=20. 4 years, SD=3.0) from the traditional learning group, and 40 (15 men, 25 women; M=20. 8 years, SD=5.0) from the combined online and traditional learning group. The online learning group and combined online and traditional learning group consisted of more female students than the traditional learning group.

Table 2 compares demographic characteristics of participants according to the three instructional delivery methods. The average age of the online learning group was 30.3 (SD=10.6) while the average age was 20.4 (SD=3.0) for the traditional learning group and 20.8 (SD=5.0) for the combined online and traditional learning group. A one-way ANOVA revealed that there were statistically significant differences in the means of age among the three learning groups, $F(2, 150) = 34.7$, $p < .001$. Because the test was significant, Post hoc Scheffe multiple comparisons were conducted to evaluate pairwise differences among the groups. The analysis revealed that the mean age of students in the online learning group was statistically significantly higher than other groups. Most students in all three learning groups were either freshmen or sophomores. The results of the pre-course knowledge test indicated that there were no statistically significant differences in the mean for test scores among the three learning groups, $F(2, 150) = .2$, $p>.05$. A one-way ANOVA revealed that there were statistically significant differences in Internet usage for educational tools among the three learning groups, $F(2, 150) = 27.4$, $p < .001$. Post hoc Scheffe multiple comparisons indicated that students in the online learning group and the combined online and traditional learning group used the Internet

more often for educational tools prior to taking this course than students in the traditional learning group. Students in the online learning group had more experience in taking an online course prior to taking this course, which was statistically significantly higher than other groups, $F(2, 150) = 3.1, p < .05$. Also, students in the online learning group had better technology skills prior to taking this course, which was statistically significant in being higher than other groups, $F(2, 150) = 7, p < .05$).

Student Achievement

All students in the three learning groups completed a pre- and post-course knowledge test to measure skills and knowledge they were expected to master during the course. The mean for the pretest score was 61.9%, while the mean for the posttest was 75.4%. A paired T-test revealed that all learning groups showed a statistically significant higher achievement after taking this class $t(179) = 15.3$, $p < .001$. Comparing the difference in the mean scores of pre- and post-tests among the three learning groups was used to determine the effectiveness of instructional modes. As shown in Figure 1 and Table 3, the mean difference between the pre- and posttest scores was 17.3 (SD = 8.3) for the online learning group, 11.4 (SD = 13.1) for the traditional learning group, and 17.8 (SD = 14.1) for the combined online and traditional group. A one-way ANOVA was conducted to compare the student achievement among the three learning groups. The analysis revealed that there were statistically significant differences in the student achievement among the three learning groups, $F(2, 177) = 5.6, p < .01$. The results of the Post hoc Scheffe test show that students in the combined online and traditional group and online learning group had a statistically significant higher achievement than the traditional learning group, and no significant differences were found between the combined online and traditional learning group and online learning group (see Table 3).

Student Satisfaction Levels

A five point Likert scale (5 = very satisfied, 4 = satisfied, 3 = neutral, 2 = dissatisfied, and 1 = very dissatisfied) was used to measure satisfaction levels of the participants with their overall learning experience including the overall quality of the instruction and the course. Students in the three learning groups provided positive ratings: the mean rating was 4.2 ($SD = .7$) for the online learning group, 3.7 ($SD = .7$) for the traditional learning group, and 3.9 ($SD = .8$) for the combined online and traditional learning group (see Figure 2 and Table 4). A one-way ANOVA revealed that there were statistically significant differences in the means among the three learning groups $F(2, 150) = 4.8, p < .05$. As shown in Table 4, Post hoc Scheffe multiple comparisons indicated that students in the online learning group showed statistically significant greater satisfaction levels than the traditional learning group, and no statistically significant differences were found between the online learning group and combined online and traditional learning group.

Student Perceptions

A one-way ANOVA was conducted to analyze mean differences in student perceptions of various aspects of the course and instructor among groups. When results of the ANOVA test were statistically significant, Post hoc Scheffe multiple comparisons were conducted to determine where differences between means existed.

Course and instructor: A five point Likert scale (5 = excellent, 4 = above average, 3 = average, 2 = below average, and 1 = poor) was used to measure students' ratings of the overall quality of the course and instructor. All three learning groups rated the overall quality of the course positively: the mean rating was 4.2 (*SD* = .9) for the online learning group, 3.4 (*SD* = .8) for the traditional learning group, and 3.9 (*SD* = 1.0) for the combined online and traditional learning group (see Table 5). Analysis revealed that the online learning group and combined online and traditional learning group showed a statistically significant higher rating than the traditional learning group, $F(2, 150) = 10.7$, $p<.05$ However, no significant differences were found between the online learning group and combined online and traditional learning group. All three learning groups rated the instructor very positively: the mean rating was 4.4 (*SD* = .8) for the online learning group, 4.2 (*SD* = .6) for the traditional learning group, and 4.3 (*SD* = .7) for the combined online and traditional learning group. There were no statistically significant differences among the three learning groups, $F(2, 150) = 2.7$, $p>.05$

Quality of Learning: As shown in Table 5, all three learning groups rated the quality of learning positively: the mean rating was 3.9 (*SD* = .8) for the online learning group, 3.3 (*SD* = .8) for the traditional learning group, and 3.7 (*SD* = .9) for the combined online and traditional learning group. The online learning group rated it statistically significantly higher than the traditional learning group, $F(2, 150) = 7.6$, $p<0.05$. However, no significant differences were found between the traditional learning group and combined online and traditional learning group.

Quality of Communication: A five point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree,, and 1 = very disagree) was used to evaluate the quality of communication. As shown in Table 6, all three learning groups rated the quality of communication experience with their peers positively: the mean rating was 3.7 (*SD* = .9) for the online learning group, 3.6 (*SD* = .8) for the traditional learning group, and 3.8 (*SD* = .8) for the combined online and traditional learning group. There were no statistically significant differences among the three learning groups, $F(2, 150) = .5$, $p>.05$. They rated the quality of communication experience with the instructor very positively: the mean rating was 4.4 (*SD* = .8) for the online learning group, 4.2 (*SD* = .7) for the traditional learning group, and 4.5 (*SD* = .6) for the combined online and traditional learning group. The online learning group rated it statistically significantly higher than the traditional learning group, $F(2, 150) = 3.2$, $p<0.05$.

Support: Most students in the three learning groups indicated that the instructor encouraged and helped them to learn. The mean rating for the instructor's encouragement was 4.4 (*SD* = .7) for the online learning group, 4.1 (*SD* = .6) for the traditional learning group, and 4.2 (*SD* = .4) for the combined online and traditional learning group. The mean rating for the instructor's help was 4.5 (*SD* = .5) for the online learning group, 4.7 (*SD* = .5) for the traditional learning group, and 4.7 (*SD* = .5) for the combined online and traditional learning group. In these two variables, there were no statistically significant differences among the three learning groups, $F(2, 150) = 2.9$, $p>0.05$; $F(2, 150) = 1.6$, $p>0.05$.

Computer Technology Skills: As shown in Table 7, students in the online learning group and combined online and traditional learning group indicated that this course helped them improve their computer technology skills. The mean rating was 4.2 (*SD* = .6) for the online learning group, 2.4 (*SD* = .8) for the traditional learning group, and 3.6 (*SD*

= .9) for the combined online and traditional learning group. A one-way ANOVA revealed that there were statistically significant differences among the groups, $F(2, 150) = 62.1$, $p < .05$. The online learning group rated it statistically significantly higher than the other groups. The combined online and traditional learning group rated higher than the traditional learning group.

Online Learning Experience: Most students in the online learning group perceived that it was easy or very easy to navigate this online course and access its materials. Compared to the traditional class, 45% of students in online learning group reported that they put in more work or much more work, 36.4 % said they put in equal work, and 19.4 % indicated they put in less work. Also, most students in the online learning group indicated they were likely or very likely to take additional online courses. More than 90% of students in the online learning group indicated they were likely or very likely to recommend the online course to other students, based on their experience in this online course. All students in the online group were satisfied or very satisfied with accessibility of a computer and online library materials needed for this course. The majority of online students indicated the main reason to take this course was convenience and flexibility.

Student comments: Overall, students in the online learning group are appeared to enjoy their online learning experience. Online students repeatedly made the following comments:

I liked the feedback from fellow classmates and the instructor on-line.
I liked the discussions and the instructor suggesting websites.
I liked the freedom to do it any time during the week.
I really enjoyed online interactive multimedia lectures.

Students in the combined online and traditional learning group repeatedly made the following comments:

I liked the whole on-line sessions.
I liked online components, it made me read the chapters carefully and not depend on the instructor to tell me the material.
I liked the discussion questions we had to reply to on-line.
I liked the online class because I think that the material was easy enough for us to learn on our own.

Conclusions

The purpose of this study was to investigate the effects of three different modes of instructional delivery (online instruction, traditional instruction, and combination of online and traditional instruction) on student achievement and satisfaction levels used in the wellness course at a mid-sized rural university. All three leaning groups made statistically significant improvement in the mean scores between the pre- and post-course knowledge tests. A one-way ANOVA revealed that there were statistically significant differences in student achievement among the three learning groups. The results of this study indicated that students in the online learning group and the combined online and traditional learning group had a statistically significant higher achievement than students in the traditional learning group ($p<.05$). Students in the online learning group had statistically significant greater satisfaction levels with their overall learning experience than students in the traditional learning group ($p<.05$). However, there were no

statistically significant differences found between the online learning group and the combined online and traditional learning group.

The findings of this study indicate that there were no significant differences in the instructor, his support and grading process. However, students in the online group rated statistically significantly higher on the overall quality of course, the quality of learning, and the quality of communication with the instructor than students the traditional learning group.

These findings suggest that a well-designed online course can be effective in teaching wellness. Also, the online learning may motivate students to become more active learners, making them responsible for more of the learning process because it accommodates different learning styles and is convenient for students. Additional research is needed to investigate the effectiveness of online instruction in all areas of education.

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Tables

Table 1. Survey respondents by gender

Groups	Men	Wome n	Total
Online	14	17	31
Traditional	42	40	82
Combined	15	25	40
Total	71	82	153

Table 2. Characteristics of participants prior to taking the course

Variable	Online *M* ± *SD*	Traditional *M* ± *SD*	Combined *M* ± *SD*	F value (*df* = 2)	p value
Age	30.3 ± 10.6*	20.4 ±3.0	20.8 ± 5.0	34.7	0.001
Student Classification	1.9 ± .9	1.67 ± 1.0	1.8 ± 1.0	0.6	0.584
Content Knowledge	61.3 ± 11.2	62.1 ± 12.4	62.1 ± 12.3	0.2	0.859
Internet Usage	3.2 ± .1*	1.7 ± 1.5	3.1 ± .7*	27.4	0.001
Online Learn. Exp.	.9 ± 1.2*	.4 ± .7	.6 ± 1.1	3.1	0.050
Tech. Skills	2.3 ± .8*	1.8 ± .7	1.7 ± .6	7.0	0.001

Note: *M* = mean; *SD* = Standard Deviation; an asterisk (*) = significance using the Scheffe procedure.

Table 3. Differences among groups on student achievement

Groups	*M*	*SD*	Online	Traditional
Online	17.3	8.3		
Traditional	11.4	13.1	*	
Combined	17.8	14.1	NS	*

Note: NS = nonsignificant differences between pairs of means, while an asterisk (*) = significance using the Scheffe procedure.

Table 4. Differences among groups on satisfaction levels

Groups	*M*	*SD*	Online	Traditiona l
Online	4.2	.7		
Traditional	3.7	.7	*	
Combined	3.9	.8	NS	NS

Note: NS = nonsignificant differences between pairs of means, while an asterisk (*) = significance using the Scheffe procedure.

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Table 5. Student perceptions of the course and instructor

Variable	Online $M^a \pm SD$	Traditional $M^a \pm SD$	Combined $M^a \pm SD$	F value ($df = 2$)	p value
Quality of Course	4.2 ± 1.0*	3.4 ± .8	3.9 ± .9*	10.7	0.001
Instructor	4.4 ± .8	4.2 ± .6	4.3 ± .7	2.7	0.073
Quality of Learning	3.9 ± .8*	3.3 ± .8	3.7 ± .9	7.6	0.001

Note: M = mean; SD = Standard Deviation; an asterisk (*) = significance using the Scheffe procedure.
A: 5 = excellent, 4 = above average, 3 = average, 2 = below average, and 1 = poor

Table 6. Student perceptions of the quality of communication and support

Variable	Online $M^a \pm SD$	Traditional $M^a \pm SD$	Combined $M^a \pm SD$	F value ($df = 2$)	p value
Commu. With instructor	4.4 ± .8*	4.2 ± .7	4.5 ± .6	3.2	0.043
Commu. With peers	3.7 ± .9	3.6 ± .8	3.8 ± .8	0.5	0.626
Encouragement	4.4 ± .7	4.1 ± .6	4.2 ± .4	2.9	0.057
Help	4.5 ± .5	4.7 ± .5	4.7 ± .5	1.6	0.214
Grading process	4.3 ± .6	4.1 ± .8	4.2 ± .4	0.9	0.423

Note: M = mean; SD = Standard Deviation; an asterisk (*) = significance using the Scheffe procedure.
a: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Table 7. Student perceptions of improvement in their computer technology skills

Groups	M^a	SD	Online	Traditional
Online	4.2	.6		
Traditional	2.4	.8	*	
Combined	3.6	.9	*	*

Note: NS = nonsignificant differences between pairs of means, while an asterisk (*) = significance using the Scheffe procedure; a: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

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Figures

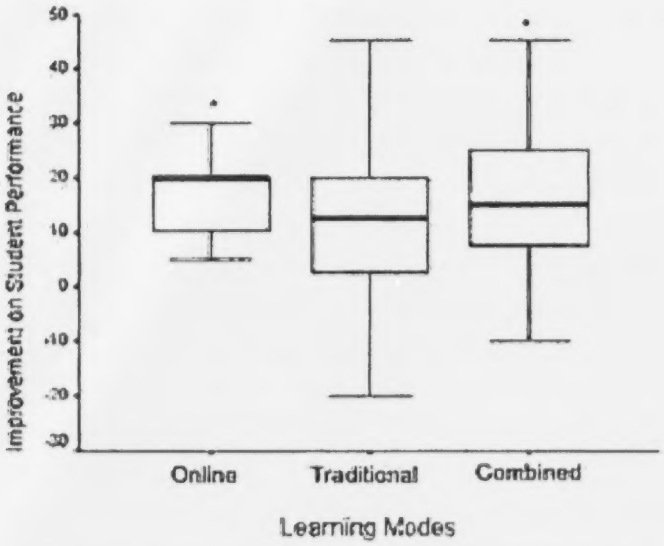

Figure 1. The mean score gained from the pre-course knowledge test
Note: an asterisk (*) = significance ($p<.05$)

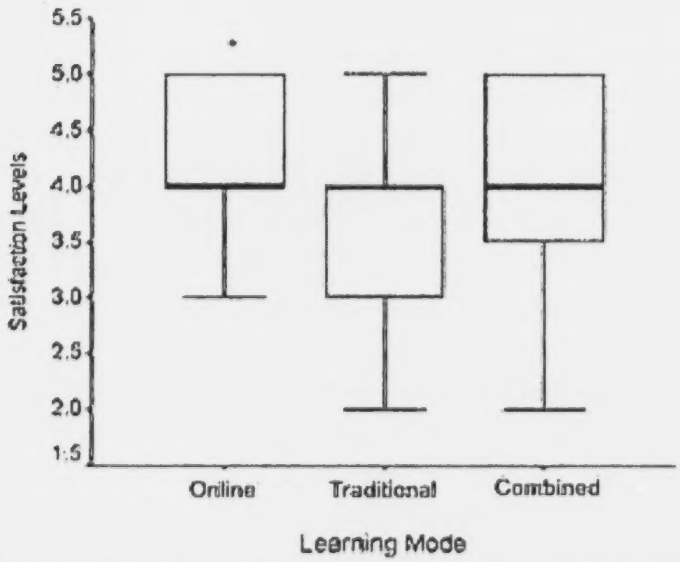

Figure 2. Student satisfaction levels with their overall learning experience
Note: an asterisk (*) = significance ($p<.05$)

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Creating a Collaborative-Based Classroom via ITV

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Introduction

America has endured many trends in its uses of educational media. Our elementary and high schools have not been the primary target group for the media of the past, but they are being targeted now. Distance education has all the parameters to effectively generate content-based, successful classes, for students at any age. Unfortunately, many media have come and gone quickly.

Undoubtedly, technology has proven to be a fundamental component of distance education (Williams, 2001). Since its introduction to the educational environment, interactive television has been seen as a way of reducing costs, as well as a way to give students of all ages greater access to an enormous variety of curriculum choices (Parkay, Oaks, & Peters, 2000). As with any new instructional medium, interactive television (ITV) has attracted critics. Although the majority of the research concerning ITV use in education supports its use, there is skepticism that the benefits are as a result of depriving students of a classroom environment where collaboration and interactivity are used consistently to promote learning.

Instructors teaching via ITV are continuously coping with an inflexible and often non-forgiving teaching environment (Parkay et al, 2000). The degree to how much influence this has on stimulating a constructive learning environment with student involvement and interaction continues to be discussed and argued. There is no disagreeing by researchers that the rigid classroom environment does indeed play a large role in the amount of collaboration that occurs.

Significance and Need

It is pertinent to the success of distant education that teachers continue to analyze the interaction taking place within distance courses. Research on this tends to vary. Landis (2001) indicated that some researchers have been quite disappointed with the degree of interaction and collaboration currently taking place in distance learning environments. Seay, Rudolph, and Chamberlain (2001) commented on one particular study in which the faculty members at Washington State noted that they were most dissatisfied with the interaction between teachers and students at the remote sites. On the contrary, as I also did, Landis has found studies to suggest that teachers and learners report a high level of interaction and satisfaction with learning results.

South Dakota has spent considerable resources to provide schools with an educational medium called the Digital Dakota Network (DDN). The DDN is starting to become a popular name in educational settings all over the state. The network consists of two-way video and two-way audio communication systems. Currently South Dakota has approximately 246 video sites, which are located within K-12 schools, Technical Institutes, State Universities, and non-educational sites. Courses and mini projects are taught year round over the networks. There is little doubt the instructors are teaching to the best of their abilities. Unfortunately, this does not assure that South Dakota students are participating in content-rich, interactive classrooms that include collaborative-based activities known to promote high-order thinking.

Purposes and Objectives

The purpose of this study was to analyze instructional practices currently being used by teachers conducting classes via Interactive Television in South Dakota. The instructors who are utilizing new forms of technology for the delivery of their instruction can add valuable insight on the median (Seay et al, 2001). We can learn much knowledge from actively studying teachers currently teaching via ITV. The resulting ideas and wisdom will benefit their successors in the field of distance education.

In addition, the study also investigated instructional procedures that promote a collaborate-based classroom via distance. As a result of the research a guide for teachers containing effective instructional procedures would be generated. Guiding research objectives included:

1. Research will analyze instructional practices being used by or known to professionals teaching at a distance.
2. Constructivist educational practices will be analyzed and combined with collaborative trends. The researcher will combine this data with distance-based instructional practices to formulate ideas and practices for teaching over ITV equipment.
3. The research will consider styles of instruction that have the ability to incorporate discussion groups and Internet support into the curriculum. The product will recommend ways of integrating the concepts while teaching over Interactive Television
4. The research will analyze the amount of training teachers have had along with the quality of the education

Methodology

Subjects

The subjects of this study were K-12 teachers, who had, or were currently instructing over the Dakota Digital Network in South Dakota. Surveys were sent to the teachers of each school who were currently utilizing their Vtel system. 32 surveys were returned. I was satisfied with the number of returned surveys.

Instruments

The main source for data collection throughout the research was a survey. Surveys were chosen to accommodate for the large quantity being administered and they tend to be unproblematic. The survey was created in a manor that included quantitative data as well as short answer responses.

Surveys were distributed via email. All K-12 teachers in South Dakota have a state email account, which made this median of distribution possible. The respondents were able to complete the survey and send the results back to me as an attachment.

Two phases of survey distribution occurred. The first phase involved sending the surveys to all South Dakota superintendents who were to forward the survey on to the appropriate instructors. The second phase sent duplicate surveys out to teachers who were teaching via the DDN at that particular time.

Quantitative data was organized and calculated based on frequency and percentage. The frequency distribution would determine the amount recorded for each topic.

Results

Data collection took place over a two-month period. Thirty-two responses were returned. Eleven of those were from districts that did not have anyone to participate in the survey and they were sending back a courtesy letter. In all, twenty instructors completed and returned the survey.

The instructors who participated in the study were asked to report the level of education they had received in regards to utilizing and instructing over interactive television. 60% of the instructors had no formal training on teaching via distance, they had self-trained themselves prior to their courses. 22% of the participants had been trained during a school-structured in-service. The participants gave the in-service an effective rating of "fair". Finally, 8% of the teachers had received a formal degree related to distance education. An "excellent" rating was averaged in determining the quality of the programs from which the degree was earned.

The teachers responded to ten questions regarding the typical activities happening in their classroom over an entire course. The teachers were to report the percentage of time commonly spent on each particular activity. They were also asked to rate what they felt their students' level of collaboration was while participating in each activity. The participants were asked to rate the level of collaboration based on a scale of low, medium, and high.

The most common instructional agenda was lecture. On average, of the courses included in the survey, lectures were going on 41% of the time during class periods. In regards to this, the teachers rated the level of collaboration that occurs through lecture as low. Ironically, the one activity that instructors think of as extremely low in student involvement is the most commonly used strategy in our distance classrooms.

The instructional procedure implemented second to lecture was the usage of problem and solution charts that prompted questions. These contributed for 10% of the class periods. This method of instruction received a medium rating in relation to degree of collaboration.

Of the choices to select from, the practice taking up the lowest amount of time in the classrooms was the use of debates between sites. Debates can be used as a way for students from all sites to learn and represent topics of discussion. Incongruously, debates received the highest rating of collaboration from the teachers surveyed, yet they were implemented the least.

A positive side of the survey was the amount of instructional items used to support the delivery of instruction via ITV. The teachers were to mark what support they had used while instructing. The majority of the items would be used during a lecture-based instruction, so there is evidence that teachers are trying to further develop their lectures. Among the choices for inclusion were book illustrations, diagrams and charts, photos, semantic maps, power points, PC-generated graphics, and brief video clips.

As the graph indicates (figure1), three quarters of the participants included book illustrations along with charts and graphs in their courses. Photos, power points, and video clips were also used in over half of the classrooms responding. Semantic maps and PC-generated graphics, received the lowest amount of usage.

The next section of the survey dealt with class web sites. Teachers were asked whether they constructed and used a website that coincided with their ITV course. Although websites are not high criteria for promoting collaboration, they are essential in maintaining important "cyber" communication and interaction with students. Corresponding websites can include information and knowledge that students otherwise might not get without it. Because it is difficult to always meet the needs of every student during a class period, the website acts as a tutor if it is designed properly.

The number of participants who included websites in the distance course was surprisingly high. Ten teachers reported having made a website to accent their course. All of the collegiate instructors I contacted had websites as well. Participants were also asked to report what components they included on their web pages that corresponded with their courses. Corresponding web pages allow for students and parents to access information more efficiently. When students are absent they can usually have access to the Internet to get started on their homework. Instructors who include tutorials and notes on their web sites give students who are struggling a convenient way to develop their understandings of the topics being covered.

Almost all of the instructors had developed a site that contained the course syllabus and contact information (figure 2). Unfortunately, a large decrease in numbers occurred when pertaining to the types of components that could actually assist in the actual instruction of the course. Course tutorials and supplementary readings were each used by only participant. Four instructors implemented lecture notes.

Next, the participants were asked whether or not they included online threaded discussion boards into their courses. 11% of instructors had included them as a means for getting students collaborating about subject topics, etc. This meant that a overwhelming majority of participants, (89%) did not included discussion boards. From the comments received, many of the high school teachers expressed a desire to implement the discussion boards, but felt they were not adequately prepared to initiate them into their courses.

The final sections of the survey were devoted to the participants' solutions for implementing collaborative-based activities, interactivity, and dialog within their distance classrooms. The answers were to be short answer statements, and a wide variety of answers were credited.

Many of the teachers participating had their own activities that promoted collaboration. Partner activities topped out the numbers as far as collaboration goes. Pairing the students with classmates from all sites and having them interview one another, work on projects together, participate in group case studies, and team projects were all examples of what is currently taking place over the DDN.

Interactivity took many forms with the participants including having relevant subject competitions between sites, charades activities, chained activities, field trips, and labs. One instructor reported spending as much as half the class period doing math problems together. (See Appendix 2 for the entire list of answers)

Promoting dialog was pretty common amongst all the participants. Many suggested keeping a log of who had spoken during class to assure everyone participated. One teacher suggested covering current events at the beginning of the class period to start students conversing. Another suggestion was to keep informed and ask about extra curricular activities the students at all sites were participating in. (Appendix 3)

Recommendations

Collaborate-Based Learning

Cut down on lecture time! "Learning is active mental work, not passive reception of teaching."(Tam, 2000) Implementing collaborative-based instruction into distance education where numerous minutes of lecture had previously been, would be to the advantage of the students. I understand that there are numerous situations where lecture seems the only strategy to use. However, research doesn't support using lecture as the primary instructional strategy, whatever the median may be.

The idea of lecture was adapted from the 19th century model of the German university. It was here that scholars would "lecture" to students about their research (Glaser & Poole, 1999). Classrooms today are not necessary filled with highly motivated students. In fact just the opposite is found far too often. As Glaser comments, students are often in required courses or find themselves choosing from a minimal list of electives. When combining these student characteristics with an instructional method that does little to anything to promote interaction and collaboration, you have a classroom that is not promoting high-ordered levels of thinking.

The perspective of constructivist learning is formed around collaboration. Learners collaborate not only with their peers, but with the instructors and environment as well (Tam, 2000). A collaborative learning environment doesn't have the limitations confined to a classroom and although distance education can provide a unique context for its implementation, collaborative learning can be achieved. A goal of devoting 30%-60% of each class period to student activity is encouraged and will undoubtedly get students collaborating with one another. (Videoconferencing) The characteristic of a genuine collaborative classroom includes the sharing of knowledge among students and teachers, shared authority between the two, using teachers as mediators, and finally, heterogeneous groupings of students (Kulieke et al, 1990) Throughout my research I was able to observe a variety of courses and projects occurring over the DDN. It was my experience that teacher talk time accounted for at least 85% of the allotted time.

A recent study published in the Iowa Encyclopedia of Action Research outlined guiding principals to help create a constructivist-learning environment. In the study,

Mary Herring (2001), collaborated with a panel of professionals to redefine the principles educators use to achieve the level of constructivism they felt appropriate for today's distance classrooms.

The fourth guiding principle associated with interactions occurring in the student learning environments. After the panel's collaboration the following suggestion resulted: "Develop learning experiences, which encourage the social negotiation ofknowledge to provide learners with the opportunity to evaluate individual understanding of concepts and to expand individual and shared understandings."

The developed principle initiates the importance of student interactions within their environment. A favorable attitude amongst students is expected to rise if the learning experience allows them to congregate with their classmates and learning materials (Herring, 2001)

Online Discussion Boards

Strategies that promote the gathering and sharing of information, as well as collaborative problem solving and questioning, are difficult to devise and carry out in any educational setting (Williams, 2001). Courses instructed via distance provide more extensive barriers preventing these from being accomplished. As times change though, the barriers are continuing to be climbed through the usage of online discussion boards.

Discussion boards have allowed instructors to create a closed community within their courses. The discussion boards can perform a variety of jobs. Among others, the tool can act as a delivery of learning materials such as readings and assignments. Most importantly, online discussions within a particular group have the ability to generate interaction about assignment topics, develop collaborative conversations, and allow students to post assignments for others to review and critique (Barnes, 2000).

In a handbook for instructors teaching at Ohio State University, Nancy Chism (2002) outlines specific goals for using discussions within a course. First she prioritizes the building of group among the students. In sharing through the discussions, the students undoubtedly share bits and pieces of their background, social culture, etc. Secondly, Chism considers the discussions as a chief way for instructors to share information with the classes. One specific collaborative learning approach she promotes is called "jigsaw". An online example of jigsaw would include asking students to research a specific topic, or parts of a more complex subject. Each student would contribute a "piece" of the whole topic. After reading all of the students' postings, the entire subject would have been covered.

Chism outlines a variety of other goals for online discussions including using them as a means for teachers and classmates to provide feedback, and as a way to further students' communication skills. Although discussion boards are utilized in the classroom in many ways, the main goal of creating a more collaborative-based learning environment is one step closer to being met when they are put to use.

Research has produced sufficient results showing that engaging in an online discussion promotes the development of critical thinking, collaboration, and reflection for the participants (Williams, 2001). When used in conjunction with an ITV course, discussion boards can adequately increase the amount of interaction and collaboration happening amongst the participants.

The survey results indicated that only two of the instructors surveyed actually incorporated discussion boards into their ITV courses. Of the college-level instructors I contacted, half of them had used online discussion boards in their courses.

Interactivity

Interactivity is really the key to creating a collaborative-based classroom. This pertains to regular classroom environments, as well as courses being taught with four remote sites. Some general strategies were combined and posted through the Pacific Bell Knowledge Network. They include:

- Bring the participants in early. Use some type of game or question that will "tap their affective domain" within the first 5 minutes of class.
- Devote anywhere between 30%-60% of the class period to student activity.
- Try to redirect class time by breaking up lecture time into no more than 15 minutes at one time. Including some type of learner-centered response or activity after this period is necessary to promote accountability for the student's own learning.
- When grouping students try to encourage inter-site partners.
- Try to accumulate the same number of questions from all sites and make sure the question is repeated for everyone to hear and comment on.
- Try to have other students respond to the question before the instructor.

Discussion

The number of students actively involved in distance education continues to rapidly increase. In South Dakota the DDN equipment has opened doors to students that never seemed possible before. Budget and curriculum cuts have forced many districts to cut elective classes within the curriculum. Students are now able to take these courses over the DDN. It is pertinent though; that our districts continue to monitor the courses their students are taking. Throughout my study I was able to observe courses being taught to high school students. I was unpleasantly surprised by the lack of interactivity and mere absence of collaboration occurring. Students taking classes via distance still need to be taught at a level that raises them from short-term processing into a level of high-order thinking.

The individuals who participated in the survey showed encouragement to my thoughts on South Dakota's progress with distance education. Although many classes are lacking key agendas I would eventually like to see in all ITV classes, many of the instructors are incorporating beneficial components pertaining to interactivity, and the majority commented on the need for self-improvement. The fact that almost 60% of the individuals took the time to train themselves to instruct via ITV shows that they are willing to go the extra mile to improve our educational system in South Dakota.

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Figure 1: Instructional Support

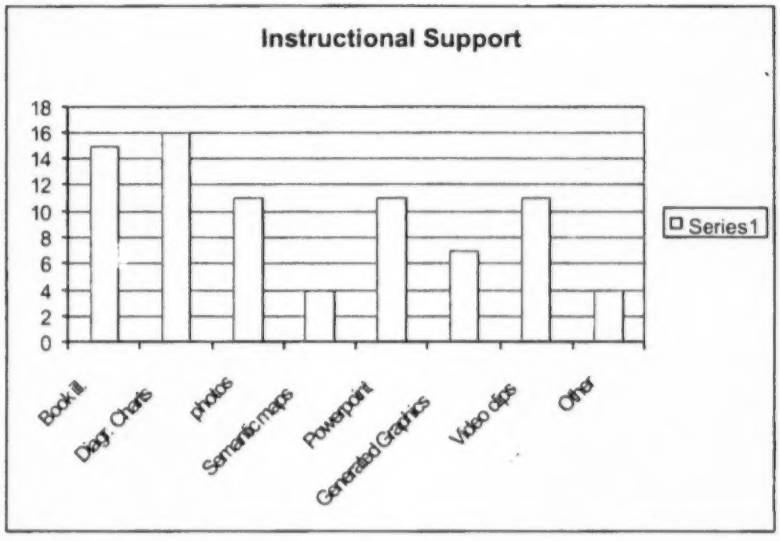

Figure 2 Website Components out of 11 participants:

Course Syllabus	8
Contact Information	9
Illustrative Materials	3
Audio/Video Clips	2
Supplementary Readings	1
Discussion Boards	2
Lecture Notes	4
Tutorials	1

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Appendix 1

Distance Educator Survey

This survey will aid in research being conducted through a Star School Grant being funded by the SDADE. The findings will assist in establishing a guideline for instructional practices currently being used over the DDN. Please take a few minutes to complete this survey and send it back via email as an attachment to the following address. Summer Pankonen@k12.sd.us

School District_____

Name (optional)_____

1. Please identify the percent of training you have received in relation to teaching via Interactive Television, and indicate the quality of that training.

	% of training received from this source	Quality: Poor (1)	Fair (2)	Good (3)	Excellent (
a. Self-taught or on-the-job work experience.	60.4%		2.23		
b. Inservice (workshops/conferences)	21.5%		2.4		
c. Formal degree	8.15%			3.66	

2. Do you have a web page that directly corresponds with the course you teach over the DDN? **11/20 58%**
   a. If yes please select which of the following components you include on the page.

   #of the 20 participants who included particular items:

   8 Course syllabus
   10 Contact information
   3 Illustrative materials
   2 Audio/video clips
   1 Supplementary readings
   2 Discussion board
   4 Lecture Notes
   1 Tutorials
   2 Other:

3. Over the course of a year/semester, roughly estimate the percentage of your time that is dedicated to the following tasks in your classes that are being connected over the DDN. Then indicate the degree of collaboration you feel the students obtain from it.

Instructional Method	% of time spent on activity	Level Of Student Collaboration: (please check) Low (1)	Medium (2)	High (3
a. Teacher lecture time.	41.4%	1.6		
b. Individual student presentations.	9.3%		2.3	
c. Pair and share (pairs of students discuss and present topics).	7.2%		2.4	
d. Instant review sheets.	5.5%	1.6		
e. Problems and solutions charts or question prompts.	9.5%		2.2	
f. Large group work	8.9%		2.3	
g. Role playing	3.7%		2.5	
h. Debates	1.1%		2.5	
I. Guest speakers	2.2%		2	
j. Other (explain)	13.1%		2.6	

4. Do you use any means of electronic discussion boards threaded forums?
Yes 11% No 89%

5. Please check any of the following that you have used to support the delivery of your instruction over the DDN.

out of 20 Participants:

- **15** Book Illustrations
- **16** Diagrams or Charts
- **11** Photos
- **4** Semantic Maps (to present (relations graphically
- **11** Power Points
- **7** PC-Generated Graphics
- **11** Brief Video Clips
- **4** Other

6. Briefly describe other means you have used to get your students collaborating in your distance class?

See Appendix 2

7. Please explain how you encourage dialog and participation in your class.

See Appendix 3

Appendix 2 - Participant Responses to Open Ended Questions

Question 6: Briefly describe other means you have used to get your students Collaborating in your distance class?

- Having Science Fairs over the DDN (both sites could have an individual fair at their local school)
- Pairs interview one another
- Classes ask each other review questions
- CD and various audio activities
- Working math problems out as a group
- Everything I did in the regular classroom
- Team projects for motivation
- Keep seating charts to maintain account for which student had contributed
- Photos and Imovie activities
- Computer simulations and labs
- Chained activities
- Meeting for field trips, or labs
- Case study scenarios
- Showing and interest and talking about all the sites extracurricular activities

Appendix 3 - Participant Responses to Open Ended Questions

Question 7: Please explain how you encourage dialog and participation in your class.

- Providing extra credit for students who participate
- Putting responsibility on the home site to help other sites begin communicating
- Pairing students in a variety of ways
- Encouraging small group discussions
- Reading allowed with following questions
- Directed questions
- Current even discussion at beginning of course
- Work out problems together
- Relevance games (ex. bingo and charades)
- Keeping a chart that allows teacher to know who has participated
- Discussion and review activities

Patterns of Communication in an Asynchronous Learning Environment

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Abstract

The objective of this study was to trace the rhythm of communication in an asynchronous learning environment, and its impact on collaborative learning. This study traced the interactions of students in a one semester graduate level class for educators seeking an MSCI degree. The research examined types and levels of involvement for the students at various time intervals during the semester. The study also examined levels of satisfaction with those interactions and the web based asynchronous learning environment. A fundamental assumption of this study was that distance environments which use the asynchronous communication function as the primary record of learner progression follow a traceable pattern similar to the traditional educational environment, with some compensations for lack of physical proximity of the students to the instructor.

Introduction

Educational institutions have successfully made the transition from viewing technology as a target in itself to a tool to be integrated for a myriad of educational goals. Instructional delivery has evolved from a simple text download to a multiplatform delivery system which utilizes any combination of email, logged chat, whiteboard, conferencing, video, and telecommunication to name a few. Still, it is unclear exactly how computer and telecommunication technology alter the nature of learning. There are hundreds of reports indicating we possess a clearer understanding of the usefulness of learning in a technology-rich environment, but few of those studies address how those learning communities develop.

One of the most prevalent features of web based instructional delivery systems is the asynchronous learning environment. Asynchronous computer conferencing is the primary learning tool of an increasing number of web delivered computer programs designed for educational use at the university level. Using this type of program the student dials into a central database and views the input of fellow students and instructors in written form. The "conversations" are threaded, one following another in longitudinal form, and are posted in a bulletin board environment. Responses are crafted and stored on the database for others to read. Discussions can take place at any time or place and can have time lapses between contributions to any number of branching threads. Typically these "discussions" constitute the vehicle for learning. This format requires a set of communication skills unique to this environment and in many respects different from

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those utilized by students in a traditional classroom. The purpose of the study is to examine the impact of the asynchronous learning environment on individuals within a learning community.

Analysis of the Literature

Convenience of Access

Distance learning is not time or place dependent, which enables a student to access the virtual classroom in more flexible ways than a traditional classroom. As Wellburn (1996) observes, the virtual classroom provides 24 hour a day accessibility for students. However, the convenience may be perceived as pressure when there are no parameters for how long a student can be "in the classroom" especially if that student feels compelled to read through every branched thread in order to stay informed. Loomis (2000) reports time management skills have the greatest impact on whether or not the asynchronous environment is perceived as a convenience or a hindrance. Hiltz (1997) also notes that due to the convenient daily access students work harder to keep up with the constant flow of input from students and instructor.

According to students in Hara and Kling's (2000) Indiana University case study, the process of online communication is more time consuming than the traditional classroom. Students reported they were "overwhelmed by the volume... and fell behind in reading and responding on-line" (p.11). Technical difficulties were also a factor causing frustration for many of the students in Hara and Kling's study. These problems varied from downloading instructional materials to prolonged loss of access due to hard drive failure. Palloff and Pratt (2001) suggest that the platform of an online course should become transparent as the student becomes engaged in the learning process.

Christensen and Anakwe (2001) found that the flexibility of the online environment was most appealing to nontraditional students with more external responsibilities while Harrell (1999) found that these same responsibilities can cause frustration in separating academic endeavors from home life.

Quality of Communications

In the asynchronous learning environment, the bulletin board consists of threaded posts which branch as the class progresses through a number of assignments. A primary post is typically the beginning of a subject and any notes or replies occur beneath the original post in hierarchical order, based on the time of the note's posting, rather than subject matter. This means that although the design of the bulletin board is longitudinal, it is by no means linear. This non-linear, branching approach to discussion has many implications for the communication process taking place among students, and between students and instructors.

In most educational conferencing programs all communications become a permanent record of the learning community's interactions, unlike the traditional classroom where conversations are transitory. This "conversation permanence" has interesting implications for the quality and substance of communications.

A student does not have to wait her turn as in a classroom; all students can work simultaneously. This cascading organization of communication makes "the collaborative advancement of knowledge the principal focus of class activity" (Hewitt, Scardamalia &

Webb, 1997, p.5). According to Hiltz (1997) this collaborative advancement must be established from the beginning of the course by regular student contributions to the class discussion; these contributions must be rich in content.

The format of simultaneous contributing is not without its drawbacks. As Hewitt (1997) points out, the asynchronous environment allows for communications which expand and branch, but offers no support for converging those contributions in a meaningful way. To accomplish effective convergence individual students must make convergent meaning from branching posts by mentally looping information, which is organized sequentially according to time of post, rather than content. Even if a post addresses many previous notes it can only be posted under one primary post without a time consuming cut and paste job. The threaded conversations thus become more divergent over time, contributing to both a sense of information overload and confusion about the intellectual focus of the [learning] community (Hewitt, 1997).

The longitudinal nature of communications also affects the nature of the contributions. Since a poster generally responds to a previous note, personal reflection may be inhibited by the need to tie one's ideas immediately to those of others. In addition, a reply is posted to one other student, causing the conversation to drift away from the core issues of the group. Hewitt (1997) suggests that this environment supports "simplistic add-on behaviors...discouraging higher levels of note connectivity" (p.4).

In the traditional classroom a student can gain insights into another's thoughts and attitudes through a combination of non-verbal cues such as body language, voice inflection, and even insights based on a fellow student's personal experiences. According to Hewitt (1997) these cues allow one individual's ideas to take precedence over another's. In the asynchronous environment these cues are absent, leaving only written conversation with which to distinguish personality and experience. The reader takes all posts under equal consideration. This contributes to the sense of information overload.

LaRose and Whitten (2000) disputes the phenomena of equal consideration of contributions in the asynchronous environment: "A pecking order of status can be readily established through evidence of course content mastery and computer skills manifested in the student dialog. Thus social incentives and status incentives are present that parallel those found in [real-time] teacher-students interaction"(p.7).

According to Hara and Kling (2000) another issue with the quality of communication is the lack of immediate feedback. Feedback is more problematic in a text based asynchronous environment where students may be attending class at any time. In Curtis and Lawson's (2001) study, Exploring Collaborative Online Learning, they observed that while feedback responses were high in the asynchronous environment, there was an absence of "challenges to the input of others...[inhibiting] the more robust exchanges that are part of the 'challenge and explain' cycle" (p.9-10).

Gilly Salmon (2001) has developed a model of interactions in the asynchronous learning environment which has a stair step arrangement with five ascending stages:

- Stage One: Access and motivation. Here platform, hardware, software and other access issues are resolved. This phase is over when the student successfully posts the first message.
- Stage Two: Online socialization. In this stage students define themselves in relation to others, and in relation to the goals of the class. Empathy and mutual respect are developed in this phase.

- Stage three: Information exchange. At this stage information flow between students, instructor and the environment increases dramatically and becomes the focus of the environment.
- Stage four: Knowledge construction. At this stage participants exchange ideas and construct knowledge around information, ideas, and shared experiences
- Stage five: Development. At this stage participants become independent learners who critically assess their own learning process.

Previous studies address the process of knowledge construction in an online learning community (Curtis & Lawson, 2001; Salmon, 2000), how it differs from the traditional classroom (Hewitt and Scardamalia, 1996; Palloff & Pratt, 2001; La Rose and Whitten, 2000) and how to address those differences in relation to student scores and satisfaction (Hara & Kling, 2000; Salmon, 2000; Christensen & Anakwe, 2001). This study seeks to verify and extend conclusions drawn by previous researchers in the field of distance learning and its impact on knowledge construction based on the types of communication facilitated by the asynchronous environment and the students' (subjective experience) perspective of the online environment.

Research Questions

This study examined the advantages and disadvantages of knowledge construction in an asynchronous learning environment. Specifically it sought to determine:

1) What is the pattern of communication in an asynchronous environment and how does it flow through the semester,
2) What is the level of involvement at the beginning, at the middle, and at the end of the course?
3) What types of interactions were taking place at each of these junctures?
4) Did these levels and types of involvements meet the needs of the students?

Methodology

Population

The population is a cohort of Masters of Science in Curriculum and Instruction MSCI students (n=18) in a graduate program which utilizes the web-based course management system WebCT exclusively. The participants were a natural group, i.e., they elected to become members of a cohort using online delivery methods to complete a graduate program and were, therefore, volunteers. Fifteen of the students were females and three were males. All had previous K-12 teaching experience. All individuals were given the opportunity to complete the subjective survey at the conclusion of the on-line course. Nine of the eighteen cohort members voluntarily completed the survey.

Instrumentation

An ethnographical approach combining informal survey, observation, and case study was used to gather and analyze data concurrently. The time frame for the study was a two year interval. The comparison of the information gathered from these sources will validate inferences about the impact of the asynchronous learning environment on learners.

Data Collection

At the end of the course, "Using Technology for Inquiry and Collaboration" (hereafter referred to as ED 630), a voluntary survey of the cohort was implemented. The survey employed a combination of Likert scale and open-ended questions for further elaboration (See Appendix 1). Archival documentation of the bulletin board communication tool was collected at the end of ED 630. This documentation was examined for patterns of communication and knowledge construction. Information from both sources was gathered about personal reflections on the learning experience.

Data Analysis

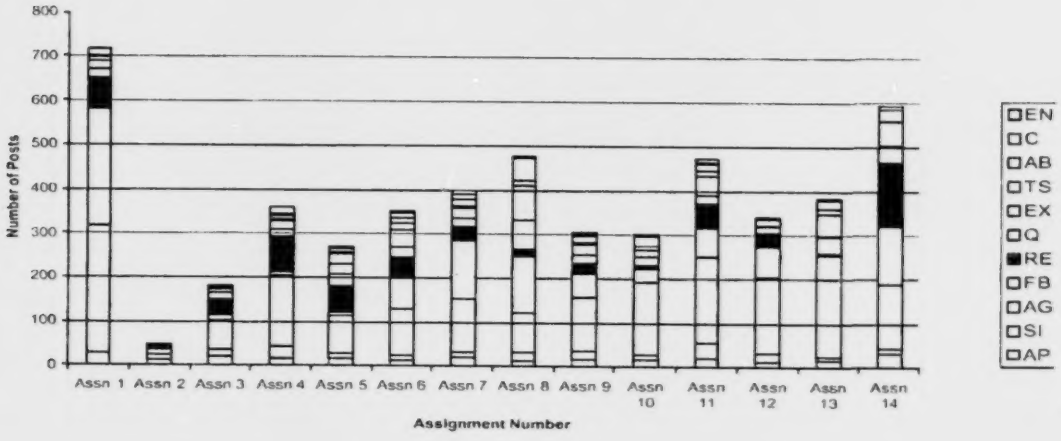
The archives of the asynchronous forum were examined for patterns of communication which indicate collaborative learning. Each communication was analyzed and assigned to one of 11 categories of communication:

- AB- Add-on behaviors are generalizations that could be directed to any post, do not contribute any dimension to the conversation, are designed simply to fulfill the discussion requirement and tend to repeat the original post in abbreviated form.
- AG- Agreement/Acknowledgement posts demonstrate that the poster read another student's assignment by addressing specific aspects of the original post while adding no new information, feedback or reflection,
- AP- Assignment Posts are the primary posts of the discussion board, are created to fulfill class requirements, and are required and defined by syllabus.
- C- Collaborations are communications intended to organize or structure future projects related to course assignments between two or more people.
- EN- Encouragements are general "you can do it" type posts which do not offer suggestions for how to "do it".
- EX-Explanations are posts which answer specific questions and generally stem from an earlier statement which resulted in a request for clarification, of a viewpoint or experience.
- FB- Feedback adds knowledge in some form to the original posts through an evaluative response, which may extend or elucidate information, offer another viewpoint or suggestion, or make generalizations or summative comments.
- Q- Questions are requests for clarification, information, or instructions, phrased as a direct question.
- RE- Reflections are posts which make personal meaning by weighing the value of a statement or information and placing that idea in a familial context, often through recalled experience.
- SI- Social Interactions are "Hello," "how are you," general solicitous comments which are not content related, and are often humorous in content.
- TR- Troubleshooting/Protocol type posts relate directly to matters of the course structure, the platform or other tech issues having to do with course completion.

Posts fell into a combination of as many as three different categories depending on content so that the numbers for each category exceed the total number of posts. All instructor posts were listed as explanations due to the nature of their content. Each of the communications was then grouped according to the assignment it addressed. These

groupings were entered into an Excel spreadsheet to determine the flow of each type of communication throughout the semester long course.

Figure 1. Patterns of Communication in the Asynchronous Environment



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Each of the assignments was examined in terms of Salmon's (2001) model of learning in the asynchronous environment based on levels and types of interactivity.

Figure 2. Stages of Interaction

Salmon's model of interactivity	Stages of interaction for Ed 630
Stage 1 Access and Motivation	Occurred before students logged onto the bulletin board
Stage 2 Online Socialization	Assignment 1 Assignment 2
Stage 3 Information Exchange	Assignment 3 Assignment 4 Assignment 13
Stage 4 Knowledge construction	Assignment 5 Assignment 6 Assignment 7 Assignment 8 Assignment 9 Assignment 10
Stage 5 Development	Assignment 11 Assignment 12 Assignment 14 Assignment 15

The surveys were used to explore the levels of satisfaction/frustration with the environment.

Results

Categorization of Communication Patterns

One of the questions surrounding an online instructional environment is what constitutes a class session. Because the asynchronous environment is not time dependent, all the posts dealing with a certain assignment constitute a class session. ED 630 was divided into 14 lessons, each with a week's worth of time allocated for posting the assignment and responding to the primary (assignment) posts of fellow students. The class was consistent in moving forward to a new assignment each week. All assignments were submitted to the bulletin board for response from the group. Various students fell behind for an assignment or two due to varying factors such as platform/computer issues, personal issues, and work related demands on time. All students finished the course in the prescribed time frame. These issues were generally shared in the bulletin board and were met with encouragement or social interaction type responses. Late assignment posts generally did not receive as much response as the group was focused on a new topic.

Assignment 1 directions were to post an autobiography that responded to a series of queries addressing personal learning preferences and online educational needs. In

response to assignment 1, agreement and social interaction posts far exceeded all other categories for the semester, approaching 300 postings for each type. Reflections numbered 66. Questions and explanations focused on the personal and professional histories of students.

Assignment 2 asked students to evaluate the learning community after reflecting on the educational biographies posted for assignment one. While the numbers of all post types fell drastically, the predominant number were again, agreement and social interaction posts numbering ten and eleven respectively. During the first two assignments minor protocol issues were ironed out. One student who had previous experience with the platform observed that the number of posts was already very high and volunteered some suggestions for organizing and reading bulletin board messages as well as posting messages in such a way as to make them convenient for others to read. These first two assignments fell under Salmon's (2000) stage two-online socialization. The two primary categories of communication for these assignments focused on sending and receiving messages designed to create a sense of community. The small number of trouble shooting posts confirms suggestion that stage one is over before students become visible to their peers because they have worked through the process of getting onto the platform and resolved any problems by the time they post their first messages.

Assignment 3 asked the students to focus on how they, as individual educators, build and maintain classroom communities in their work environment. There were a series of personal queries as well as a reading prompt. Agreements and reflection trended upward during this assignment while feedback, questions and explanations rose slightly denoting a cycle of concrete information sharing. This assignment marks a transition between stage two-online socialization and stage three-information exchange. Salmon (2000) states that in this stage participants are occupied with "exploring known (to them) answers or on aspects of problems or issues" (p.31). A typical question/explanation cycle looked much like this:

> Val, I'm curious about the simulation you mentioned in this posting. I must have missed something prior to this, would you mind filling me in??? J.Q. (personal communication, February 11, 2001)
>
> Jan- the simulation I mentioned is called Discovery One- a simulation on the colonies. The students have to learn the geography of the colonies, complete tasks to earn passage to America, and once there develop a strong colony. I don't know who enjoys it more, the kids or me. I also do a Civil War simulation which we're almost ready to begin. V. P. (personal communication, February 22, 2001)

Assignment 4 asked students to respond to a reading assignment which was posted in the WebCT platform. There were no specific queries, only a request for thoughts and insights. Agreement and reflection posts spiked for this exercise. Explanation posts continued an upward trend while question posts stabilized. This assignment drew stage three interactions as information began to flow freely between participants. During this assignment the messiness of the asynchronous environment became apparent as threads began to diverge. The instructor posted expectations for posting, reading and responding, and emphasized that the goal was to learn from each other. She received some interesting responses:

> Thanks for the direction. A student can only type "good job I agree with that" so many times. I have so much more to say when there is something to disagree about. I wonder if that will happen. L. A. (personal communication, February 9, 2001.)

This participant early on perceived the lack of challenge and explain cycles that stimulate critical thinking through conflict in the face-to-face environment. Another student posted this:

> Thanks for the insight and you are right in this short six weeks I have learned more about people I have taught with than in the past years of teaching and have become acquainted with many other fine educators. S. K. (personal communication, February 13, 2001)

In responding to another participants assignment post this student struck upon the constructivist nature of participant interactions in the asynchronous environment:

> When I was reading your thoughts it dawned on me how alike your classroom must be to ours online- we are also writing to explore our beliefs and are validated by our peers. We are learning from each others experiences. V. P. (personal communication, February 11, 2001)

These posts demonstrate that it is possible for participants to reveal themselves and their experiences in a way that makes them "knowable" online.

During the fifth week students performed Internet research of a specified topic and reported their findings to the bulletin board. This was the first exercise requiring participants to go beyond the platform or their personal experiences to access information. Agreements and reflections trended downward during this assignment but were still the predominant posts at 87 and 59 respectively. Questions spiked at 28 along with trouble shooting posts at 24, while explanations were stable. Assignment 5 marked the beginning of more individualized assignments. The assignment posts tended to summarize and evaluate the information each student found in the Internet search. Those who did not evaluate their findings in the initial assignment post did so as a process of interactions with other students about their findings. This evaluation process prompted more of a value laden question/explanation cycle. During week five interactions between participants involved more risk-taking, i.e., students tended to honestly assess not only the information but themselves as well, as in the following discussion over an article on professional development schools:

> Both you and I wrote about the PDS without adding our personal comments. We just posted our findings. Now let's get down to the nitty-gritty. What do you really think of PDS? How would this more clinical approach change the face of education? I can see where it would make us appear to be more professional, don't you? S. W. (personal communication, February 18, 2001)
>
> Sharon, I think the key word you used was "appear" to be more professional. If used correctly, PDS could be effective. I'm very interested in research- too bad we don't have more time during the school day for more professional development. I find my planning period slipping away each day! I don't know if we need more of a clinical approach to education, however, I feel I am now at a standstill and want to learn more- a different approach. Maybe it would be more effective. J. J. (personal communication February 24, 2001)

This assignment represents a transition from stage 3-concrete information exchange to stage 4-knowledge construction. Participants grappled with issues that did not have clear answers, sharing experiences and perceptions in order to make sense of the material they shared. They attempted to negotiate meaning by putting information into a collective perspective based on personal shared experiences. Participants took the perspective of the article, measured the perspective against their own experiences and made value judgments which were theory or practice based. And example of a practice based value judgment is this student's reflection on an article about teacher expectations:

> This article made me do some thinking. If it is in the best interest of the students for teachers to be as unbiased as possible why do they send cum [cumulative] folders etc. to us before we ever get a chance to meet our class? Personally, I do not want to read about last year. I know cum folders have their place, but I do not want my expectations tainted by what I may read. Many things can change, and quickly, about the student. I would rather take my chances and see what comes along. Sometimes all a student needs is a fresh slate. J. D. (personal communication, February 20, 2001.)

During this time frame a conversation developed about levels of participation in the discussion board and the protocol for participation, contributing to the elevated number of trouble shooting posts. This thread developed as a result of mid-term assessments which were sent to each participant via private email, and included statistics on number of log-ons and posts. The ensuing debate about course expectations spilled over into Assignment 6 as students articulated their approaches to dealing with the information glut.

Assignment 6 required students to compare and contrast different perspectives regarding professional development. This assignment was a formalized extension of the type of constructivist interactions which occurred spontaneously in assignment five. Agreements, feedback and reflection were the predominant posts, with feedback posts rising sharply. Trouble shooting posts remained high due to the ongoing conversation over posting protocol. Assignment 6 responses demonstrated all the attributes of Salmon's (2000) stage four knowledge construction. Socially constructed meanings developed based on the sharing of insights and experiences and the collaborative development of ideas. Threads of discussion expanded and brought in more tangential topics. One student's assignment post spawned threaded discussions on budget cuts, personal technology skills, student technology skills, professional training, attendance at conferences, in-service topics and union membership. The thread addressing post protocol and course expectations became heated when a participant who was regarded as a master teacher by her peers posted the following communication which she titled "The Numbers Game":

> OK, I'm confused. I did not realize that when I joined this class, I would become involved in a numbers game. I knew it was my responsibility to post and respond weekly, but in my naiveté, I did not know that the number of times I read would be compared to the number of times I responded. Since I love to read, I have enjoyed reading other people's responses and have actually read some more than once. In the numbers game, this counts against me. I also thought that nothing more needed to be said about some postings. Enough is enough. In fact, I think we were told we did not need to respond to all postings. I guess that I am

> disappointed that a software program report may influence the quality of our work in an attempt to make our numbers look good. How do you feel? S. W. (personal communication, February 24, 2001)

This post solicited 23 responses addressing the nature of the platform and the expectation of the course. One student aptly named this threaded discussion "panic posts." Many of these posts addressed how people chose to learn in this environment. As a participant of the class the author posted this "calm down" response:

> Sharon and others, it's true that WebCT does accumulate numbers on how many times you log on and how many times you post. I have looked at these numbers. However, I do not believe that you should be in any way concerned about posting just to keep up with the Jones.... And who responds out loud to everything everyone says in a regular class? I can say with the greatest conviction that the numbers the software accumulates are not for the purpose of grading, although they might correlate to learning style for the purposes of instructional research. A. P. (personal communication, February 26, 2001)

Even though students were very upset about the perception that they might be graded on the number of posts they looked to each other for input to resolve the posting issue rather than to the instructor, indicating a growing sense of community. They also examined their own cognitive processes in relation to the asynchronous environment, a hallmark of constructivist learning. These exchanges would be highly unlikely in the traditional classroom where the instructor is "ever present".

Assignment 7 asked all students to read a prompt which had been made available through the platform. While this assignment replicated Assignment 4 in design, the response pattern shows a different set of communications. Assignment 4 precipitated eight feedback responses while Assignment 7 captured over 130. Feedback peaked for the entire course after an upward trend beginning from Assignment 5. Agreements also peaked after an upward trend from Assignment 5. Add on behaviors rose possibly because all students responded to the same reading prompt. Once in the knowledge construction phase substantive interactions remained constant as participants relied on their ability to learn form each other. Posts during Assignment 7 followed the same pattern as Assignment 5 and Assignment 6, due to participants' increasing confidence in the ability to construct knowledge as a group. Students also began to speculate collectively about outcomes for the course as well as their culminating projects for the completion of the cohort graduate program.

Assignment 8 asked participants to consider their own possibilities for action research projects. Students were to compare and contrast interests with those of others. Levels of feedback remained high at 130 while questions and explanations spiked to 66 and 68 respectively. Agreements dropped to 89 and reflection posts dropped to fifteen, the lowest number since the second week of the class. Collaborations shot up 51, the highest number for the entire course. Collaborations tended to center on the group of educators who worked in the same physical locations, as demonstrated in this post:

> We are very fortunate to have so many teachers from the middle school taking this class together....After our meeting tonight, it became very clear to many of us...that the new PowerGrade system our school district is using would be a great topic for action research. K. H. (personal communication, March 7, 2001)

This post solicited 28 responses, many of which enlarged on the original post:

> I like this idea because it not only includes what we need to be doing anyway… (notifying parents of failing grades, giving feedback in a timely manner, and recording grades and comments) into what we want to research. We will be able to include SPED, regular Ed, teachers, and also parent viewpoints. D. S. (personal communication, March 8, 2001)

For this assignment students took various positions as they weighed the pros and cons and considered possible outcomes of various research projects. Posts which were not collaborative in nature consisted of individual experiences with topics under discussion as in this feedback response to a participant who was considering block scheduling s a research topic:

> I'd like to give a little input about the block schedule….All four of my children have had a chance to experience the block schedule…they have all been happy with it for several reasons. They felt like they had a much better opportunity for questions and assistance with theirs teachers, especially in the math classes. Any industrial arts classes were great because they actually had time to work, not just setup and take down. D. S. (personal communication, March 16, 2001)

Assignment 8 continued the stage four-knowledge construction with the caveat that much of the agreement was replaced by questions, explanations and collaborations, revealing a higher intensity of knowledge exchange than in the previous three assignments. This was most probably due to the open ended nature of the assignment with no fixed reading prompt or set of queries. Assignment 8 marks the apex of the knowledge construction stage.

Assignment 9 represented an extension of the process that took place in Assignment 8. The assignment asked students to read a brief explanation of the action research cycle. Feedback, questions, explanations and collaborations fell off sharply and agreements again became predominant with121 postings. The brevity of this assignment solicited the most brief assignment posts and responses in the bulletin board. Assignment 9 fell into the stage four but represents a downward trend in knowledge construction as it brought some closure to the discussions taking place in Assignment 8.

Assignment 10 asked students to examine two web sites focusing on action research in education. One site was organized in a PowerPoint format while the other consisted of a complex set of links and search functions. For this assignment agreements rose to 160 while feedback and reflection both dropped drastically. Add on behaviors jumped to 22, the highest number for the course. One of the first posters for this assignment compared the two sites in terms of ease of navigation and a general bandwagon effect occurred which accounted for the increase in add on posts. While this assignment was designed to elicit knowledge construction based on exploration of the two sites most of the participants did not take the time to deeply explore the more complicated of the two sites and substituted a superficial comparison for a close examination of the information presented. This assignment was done toward the end of March, and students may have been experiencing mid term slump. Duffy and Jones (1995) extensively documented the phenomenon of midterm slump in Teaching within the Rhythms of the Semester. However, the failure of students to perform a detailed

analysis of the second, more complicated site may also have represented a case of information overload.

Assignment 11 presented four case studies with a set of queries for consideration. Students were asked to respond critically to each. Although it served as a preparatory assignment for the reflective writing in Assignment 12 required for admission to the MSCI program this assignment deserves individual examination for the communication pattern it generated. Agreements spiked to 194, the highest since the first assignment while feedback and reflection both rose as well. Explanations also spiked to the highest point for the course due to instructor commentary on every assignment post. This assignment acted as a catalyst for participants to transition to stage five-development. Students explored their own thinking processes and ideas in relation to each of the cases studies. Participants relied heavily on mental models derived from past experience to address each case. Responses often explored the unknowns of each situation and proposed alternative solutions. Participants also commented on their own situations in relation to the case studies, as in this response:

> Julie, the nice thing about these case studies is they allow you to think about them. I looked at my classroom and played the what if game. Every setting is different. B. H. (personal communication, March 31, 2001)

Many of the feedback posts articulated a high level of emotional involvement with the case studies:

> The public emphasis on grades, to me, is appalling. I know students who can attain A's without stretching a brain cell. Yet the students who work like mad to make progress are not considered as successful by others, just because of grades. J. D. (personal communication, April 1, 2001)

Social interactions also rose to the highest level since assignment one. Gilly attributes this to coping skills required for stage five interactions.

Assignment 12 involved two tasks. The first was to complete the reflective writing assignment for admission to the MSCI program. The second task was to reflect on the individual learning process for the course. Participants completed the first task and mailed it without posting their work to the bulletin board. The participants had become so thoroughly accustomed to posting their work for public viewing and response that the mail-in assignment led to a threaded discussion expressing confusion and disappointment over lack of consensus building through sharing ideas. For the second exercise in Assignment 12 agreements, feedback and reflection remained the highest three post types, as in assignment 11. Participants reflected and provided feedback on their individual learning processes as well as group learning processes. Participants also reflected on how the group had evolved using the online format and how the learning process was affected by the asynchronous environment. This reflection on the interaction between learning and technology is a key element Salmon's (2000) stage five development process.

Most participants stated that they did not mind the distance aspect of the course and articulated a number of advantages to the asynchronous environment. Many of the participants noted that waiting to respond until they had read a message two or three times afforded them a sense of leisure in the reflection process. Others cited the ability to fit the class into their personal schedules. Participants also mentioned that more thinking and responding occurred online than in a traditional classroom and that personalities are

reflected in the more intense interaction on the bulletin board. One participant stated the advantages for an individual who is shy:

> I much prefer this to a classroom setting, since I'm a bit uncomfortable in groups. I'm not a great writer but after doing this I'd rather write then speak to a group. This gives me a comfort zone. J. Q. (personal communication, April 26, 2001)

Another student expressed her sense of community like this:

> I feel the "cohortiveness" of the group. I do have a sense of what it would be like as a blind person though. I'm working without visuals, but have a keen sense of the cohesiveness of the group. V. P. (personal communication April 11, 2001)

These communications support the notion that in the asynchronous environment there is equal consideration of all posts. Another participant mentioned how the interests of others prompted her to expand her knowledge in areas she would not otherwise have explored. Many students expressed a high level of comfort with the platform and increased confidence with technology. Much of the communication revolved around the egalitarian nature of the bulletin board.

Some of the negatives mentioned were lack of feedback from the instructor, the lack of concrete examples of successful work, the perceived need to go online every day, lack of face time, and the repetition of ideas leading to a constant struggle to keep up with the reading.

Assignments 13, 14 and 15 all revolved around the posting of the final project and will be considered together. The instructions for Assignment 13 were to prepare and post an outline of the final project which was a literature review. Trouble shooting posts rose slightly for this assignment due to outline formatting problems in the platform. Agreements and feedback were the two most prevalent posts while reflection fell sharply due to the concrete nature of the assignment. Questions and explanations also increased drastically from assignment 12 as participants sought clarification about the projects of fellow students. Interactions focused on concrete knowledge exchange bringing the class back stage three- information exchange.

Week 14 and 15 assignments were to post the final project and provide reactions to the final projects of classmates. In effect students were given two weeks to past and react rather than one week as in all the previous assignments due to the depth of the final project. Feedback and reflections both increased drastically with reflections reaching a high point for the course at 148. Agreements dropped to 144, the first time they fell below the level of reflection posts for the course. As a matter of closure, students communicated at level 5 interactions, again reflecting on how the projects of individuals had evolved and where speculating about the evolution of such projects during the course of the MSCI program. They further evaluating individual and group learning.

Voluntary Survey

Of the total population of 18 students who completed the course, 9 answered the survey. In answering the two questions dealing with online communications over half of the respondents had some prior experience with discussion groups. One had no prior experience and two had posted to discussion groups regularly. Over 75% of the group had taken one or two internet courses before and the remainder had taken three to five courses prior to enrolling for Ed 630.

In the survey section dealing with student experience and assessment of communication in ED 630, eleven of the questions were Likert scale type responses. The remaining six questions were open ended questions asking for further explanation of responses to Likert scale questions.

Seventy-seven percent of the respondents stated that they attempted to read every post while the remainder read what they had time for. Seventy-seven percent also stated that there were too many posts to deal with effectively while the remainder felt that the number of posts was acceptable to the learning environment. The respondents who felt comfortable with the number of posts also responded that they posted to the board "when they got a chance." This correlation seems to indicate that since these students did not feel pressured to post they had more time to read the posts of their fellow students.

Over half of the respondents stated that the quality of discussion was enhanced by the ability to post to any thread at any time. Those who felt it enhanced the quality of discussion mentioned that everyone could post her own thoughts in her own time and that students who would be listeners in the traditional environment could express their thoughts and be reinforced. Negatives mentioned were redundancies in responses and that by the time the responses were all examined the reader had forgotten the content of the original post.

Eighty-eight percent responded that levels of interaction were higher in the online environment than in the traditional classroom. Students who felt that levels of interaction were higher mentioned that everyone responded to everyone at one point or another, indicating that they perceived the student to student interaction as increased in comparison to the traditional classroom. One student mentioned that pressure to post "for the grade" impacted the levels of interaction, but that the ability to "address an archival conversation" increased the levels of response. This student perceived that the anytime/anywhere capability of the asynchronous environment not only enhanced the quality but also increased the levels of response.

Seventy-seven percent of respondents stated that communications became more divergent due to the increasing number of threads. Those respondents who stated that communications became more divergent over time cited such contributing factors as varying opinions, unrelated material being brought into the conversation, more ideas being introduced, the apparent unrelated manner of reacting to the posts, i.e., not tying various conversations together, and burnout over time.

Eighty-eight percent of respondents stated they were comfortable with the level of feedback. One student mentioned thoughtfulness and helpfulness of responses. A number of students mentioned that the quality varied, that some of the responses were well thought out while others simply responded to "boost their numbers".

The respondents were split between the opinion that the course was more student directed than a traditional or that the course was more self-directed. Respondents who stated that the class was more student-directed mentioned advantages such as ownership and responsibility for learning, that everyone was paying attention to what was said, and questions were directed to each other rather than the instructor. Respondents who felt the course was more self-directed mentioned that the online format allowed room for individual discovery and exploration of topics, the ability to work at one's own pace and in one's own style, and that the students were not all being "led down the same path" by the instructor. One student mentioned that, for her, the student-directed nature of the

learning environment was sometimes a disadvantage when things "aren't black and white."

All statements about the impact were positive. Respondents pointed to advantages such as the increased connectedness between students, increased support, increased rapport, flexibility of access, and the ease with which a wide range of opinions and experiences were shared. One student addressed her experience as a floater in the online environment, stating that, "Though we have never met most of our classmates in the flesh it is possible to build bonds." Another summed up the general opinion, "Basically I think the overall impact of receiving insights, ideas, and knowledge from others in other areas is a positive, effective medium for building community as well as global knowledge. In other words, any time you expand your horizons you're doing yourself a favor". This student intuited Hewitt's (1997) idea that in the asynchronous environment participants must figure out who and where the divergent interests of the group intersect to create meaning.

The questions with the greatest agreement (more than 75%) dealt with issues of interaction and feedback while questions gleaning the greatest divergence of responses dealt with approach to completing assignments. Every respondent expressed high levels of satisfaction with the asynchronous environment's impact on knowledge construction while the primary source of dissatisfaction was repeatedly expressed over the numbers of posts and the corresponding pressure to read every post.

Implications for the Asynchronous Learning Environment

Communication Patterns

Participants in ED 630 quickly moved from Salmon's (2000) stage one- access and motivation to stage four-knowledge construction. This was due to the rapid development of security in the learning community as evidenced by the high number of social interactions for assignment one. While these interactions dropped drastically in assignment two and were relatively low for the rest of the course, they constituted an integral part of the conversation. Socialization posts tended to occur in groupings, never as isolated posts; they were essential to the development of the collaborative atmosphere of the online class.

Agreements were the dominant posts type for the entire course, surpassed twice by feedback posts during Assignments 7 and 8 and by reflection posts in Assignment 14. Agreements were for the most part an essential element of substantive discourse. In combination with the other three primary types of posts- feedback, reflection, and the question/explanation cycle agreement denoted high level participation while in the absence of those types it acted as a substitute for knowledge construction.

Assignments 3 and 4 established the information exchanged phase which developed the confidence the participants needed in their own group expertise, and was a necessary prerequisite to knowledge construction. Assignment five marked the transition to stage four knowledge construction. Agreements, feedback, reflection, and the question/explanation cycle were the dominant types of interaction for both information exchange and knowledge construction. The primary difference in these two phases was not the type of interaction but the substance- concrete knowledge and experience or speculative theory and possibility. The participants remained in this stage

(with a lapse during Assignment 10) until Assignment 11 when they transitioned to stage five- development.

Stage five development is defined by independent learning and reflection on the learning process. Interestingly, students showed some resistance to this stage when they expressed discontent over submitting Assignment 12 without sharing with the group. In doing so they reflected on the cohort's learning style- which might by categorized as learning by consensus building. Analysis of the bulletin archive in light of research questions one, two, and three reveals that students transitioned to stage three information exchange by Assignment 3, transitioned to stage four knowledge construction by Assignment 5, which was one third of the way through the class, and remained there until spurred by the parameters of Assignment 11 to move to stage five development. Instructional design seemed to play a large factor in levels of involvement. Interactions focused on agreements, feedback, and reflections, their levels varying according the parameters of the assignment.

Satisfaction levels

Relating to research question four, all the participants said they enjoyed the asynchronous environment for learning, namely the quality of communication it provoked. The convenience of the asynchronous environment appeared to be a double edged sword. Many participants expressed a sense of being overwhelmed by the number of posts and discussion threads and the subsequent need to sort out meaning. All were content with the richness of exchange. While it is true that asynchronous communications can be unwieldy for students to evaluate due to their diverging nature, Hewitt (1977) suggests, "This is where new ideas are nurtured and developed" (p.6). The threaded discussions also forced students to prioritize information and to compare perspectives without bias. This study confirms Arbaugh's (2000) conclusion that students' perceived learning is increased by constructive interactions of the asynchronous environment more so than the format's convenience or ease of use.

Students also mentioned the notable absence of the instructor, who in the case of ED 630, was also the moderator. A number mentioned the desire for greater feedback and concrete examples of " the right way" While Hara and Kling (2000) noted the logistical difficulties in keeping up with a large group of students who are contributing to the class discussion around the clock, there is a deeper reason for the comparative silence of a moderator/instructor. Introducing a moderator, who steers the conversation or interacts at the level of a participant, detracts from the egalitarian nature of threaded discourse and tends to produce followers in a moderator-centered discussion. The introduction of moderated discourse would de-emphasize the process of "summarizing and synthesizing ideas" at the individual level (Hewitt, 1997, p.6). One participant summed up this notion:

> One of the most difficult things for me has been the lack of direction on various assignments. While this has been frustrating at times, it has taught me to be more reflective. I now understand that right or wrong is not the goal but educational growth through trial and error and consideration of different issues presented. K. H. (personal communication, April 15, 2001)

Curtis and Lawson's (2001) notion that there is a notable absence of disagreements and challenges in the asynchronous environment held true for this class. This element may have been absent from the bulletin board exchanges because in the

traditional classroom the moderator is visibly present to keep verbal exchanges form getting out of hand. Maybe the students were apprehensive of conflict. Maybe the permanent nature of the conversation compelled them to "play nice". When they were forced to submit an assignment with out reaching a consensus on the correct answer, many participants expressed discontent. However the void left by this absence seemed to be filled by gentler version in the question/answer cycle.

Participants expressed strong satisfaction with the egalitarian nature of the bulletin board. They mentioned that everyone contributed and was responded to in ways that validated their contributions, debunking la Rose's notion that a pecking order develops in the asynchronous environment.

Levels of satisfaction expressed in the bulletin board were consistent with those expressed in the volunteer survey, indicating a very high level of satisfaction with the quality of learning and varying levels of frustration with time management issues and the effort required to extract meaning from the asynchronous learning environment. Analysis of the bulletin board posts and the volunteer survey worked together to provide a clear answer to question four.

The elements of asynchronous environment that make it difficult to negotiate are the same ones which cause reflection and evaluation on the part of the learner. Comfort level may not be a large factor in overall learning. In the learning community of an online classroom all students' ideas become "objects of inquiry" because they are made publicly available (Hewitt & Scardamalia, 1996). The goal of the online learning community is to extend the knowledge of the collective and the responsibility for this lies equally with each learner in community.

The asynchronous structure of communication promotes higher order thinking skills among the students in a distance education course because of its egalitarian, divergent, student directed influence on individual understanding. Is it necessary or desirable for every student to derive the same usefulness from a community of learning? Do we all have to learn the same thing? In the asynchronous environment learning is constructed by the dynamics of group participation, but the individual determines what knowledge is gained.

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Appendix 1

Questionnaire for ED 630

WEB CT, the distance-learning program we have been using for our class, is considered an asynchronous computer conference environment. This means that students dial in to a central database and view the input of their fellow students and teachers in written form. Responses can be crafted and stored on the database for others to read. Discussions can take place without having to coordinate a common meeting place or time. The following questionnaire addresses your perceptions about communications in the asynchronous learning environment, and how they affect the student's learning experience. Please **circle** the letter next to the phrase which best reflects your Internet learning experience. The options for response are gradational. Please choose the response that most closely matches your experience. Some of the questions offer you a chance to qualify your answers. Thanks for the input!!

The first two questions deal with experience prior to participating in ED630.

1. How much previous experience have you had with bulletin boards or chat rooms using the Internet? This may include interest groups outside the educational environment.
    a. None
    b. I have participated in one or two discussions groups
    c. I have posted to a discussion group occasionally (once or twice a month).
    d. I have posted to a discussion group regularly (weekly or more).
    e. I have read and posted to discussions daily

2. What previous experience do you have taking a course using the Internet as the delivery system?
    a. ED 630 is my first experience with online delivery
    b. I have taken one or two internet courses before
    c. I have taken three to five Internet courses before.

The following questions deal with your experience/ assessment of communications using the asynchronous environment of WEBCT.

1. How much time did you spend reflecting on and designing your responses before posting to the bulletin board?
    a. More than I would have in the traditional classroom environment
    b. Less than I would have in the traditional classroom environment
    c. About the same as in the traditional classroom environment
    d. It varied with the subject matter of the thread

2. How much of the threaded discussion did you read?
    a. I made an effort to read every primary post.
    b. I read posts containing subject matter that interested me
    c. I concentrated on posts of certain individuals
    d. I read whatever I had time for and did not discriminate or choose certain posts

3. How often did you post a response to the bulletin board?I made a best effort attempt to reply to every primary post.
    a. I posted only to those discussions that interested me.
    b. I posted primarily to people, not subject matter
    c. I posted when I got a chance.

4. How did the bulletin board environment affect the nature and quality of your posts? (Please consider only responses, not primary posts.)
    a. I found I was more concerned with public scrutiny of my responses and made an effort to " craft" a quality response, than I would have in a traditional setting
    b. I felt more spontaneous about my responses, knowing that I would not "see" classmates.
    c. My responses were no different than they would have been in a traditional classroom.
    d. I spent more time in reflection before responding because the "statements" of my classmates were "permanent" and therefore I could take more time to consider them.

5. What do you think about the number of posts?
    a. There were too many to deal with effectively
    b. The number of posts was acceptable to the learning environment.
    c. There were not enough posts.

6. What do you think of the quality of posts?
    a. The posts offered a rich source of discussion and exchange.
    b. There was too much off topic discussion on the bulletin board.
    c. The bulletin board environment is too impersonal, with no chance to really get to know my fellow students outside their responses to assignments.
    d. The combination of assignment discussion and off topic conversation was comfortable for me.
    e. The threaded environment allows everyone to "talk" at once.

7. How did this affect the quality of discussion?
    a. It enhanced the quality of discussion
    b. It detracted from the quality of discussion
    c. It did not alter the quality of the discussion
    d. Please explain why you responded as you did in questions #7.

8. How do you perceive the level of interaction in the asynchronous environment?
    a. Levels of interaction were higher than the traditional classroom
    b. Levels of interaction were lower than the traditional classroom
    c. Levels of interaction were the same as the traditional classroom

9. If you believe levels of interaction were altered by the asynchronous environment, why is this so?

10. Do you believe that threaded discussion in an asynchronous environment becomes more convergent or more divergent over time?
    a. More divergent
    b. More convergent
    c. Stays the same

11. Given your response, to Question #11, why was this so?

12. Do you feel that you received enough feedback for your assignment posts? (These would be your primary posts dealing with weekly assignments.)
    a. There was so much it was difficult to keep up with.
    b. I was comfortable with the level of feedback
    c. I did not receive enough feedback to my posts.

13. What do you think about the quality of the feedback to your assignments?

14. What is your assessment of the direction of this class?
    a. It was more self-directed than the traditional classroom
    b. It was more student-directed than the traditional classroom
    c. It was more teacher-directed than the traditional classroom

15. Consider your answer to Question #15. Is this an advantage or a disadvantage? How?

16. In your view what is the overall impact of asynchronous communications on a knowledge building community?

17. What was you profile according to the Keirsey Personality Indicator we took at the beginning of the course?

Thanks for your time and effort:)!!

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